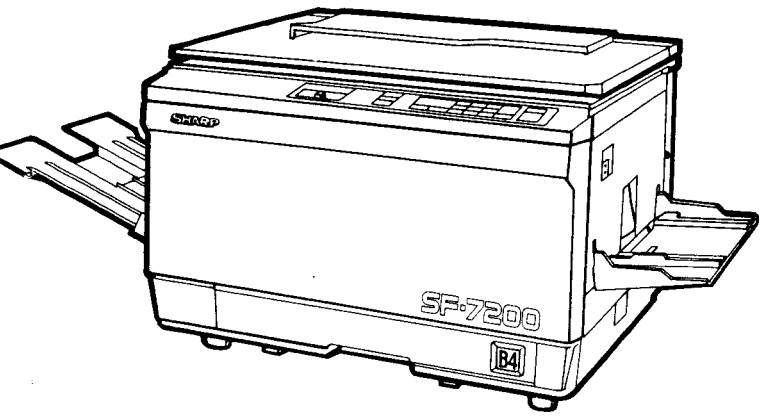
# SHARP SERVICE MANUAL

CODE:00ZSF7200SM/E




## MODEL SF-7200

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SHARP CORPORATION

## FEATURES:

- The SF-7200 has a moving original table copier which is capable of producing 12 (letter size, A4) copies per minute. The maximum original size is 10" x 14" (B4).
- Two-step enlarge/reduce ratios:
  Maximum enlarge ratio up to two times the original image (four times in area).
- Color copying:
  Exchanging the developing unit enables you to produce clopies in black, blue, red, or brown.
- Automatic preheat:
  In order to save power consumption, the copier will go into the preheat mode automatically, when the machine is left unoperated for about 20 minutes.
- Front loading cassette:
  It has the front loading, two-way cassette method. A 250-sheet universal cassette can be loaded on the machine on the lower part of the front cabinet, it permits easier cassette mounting. Not only does this eliminate the cassette from projecting out from the machine, but it also saves on machine operating space.
  The manual paper feed tray also works for a manual insertion of special paper and single sheet two sided copying.
- Automatic exposure:
  Clear image reproduction is obtained automatically. The degree of exposure is determined by the copier, based on the original density and background color.
- Use of the OPC drum:
- Clam shell design:
  The SF-7200 incorporates a clam shell mechanism that permits easier access to the internal mechanisms for machine servicing, drum replacement, and paper misfeed removal.
- Self diagnosis:
  The cause of a machine malfunction is displayed as an alphanumeric status code on the multicopy display.
- Test command function:
  Test commands help to locate trouble, or check the proper functioning of a component.
- Internal drying heater:
  Drying heater is used to prevent condensation caused by abrupt temperature changes.
- Keyboard commands:
  Permits multicopy of 1 to 99 sheets, repeated copy, and interrupted copy (PAUSE) during multicopy operation.
  A second multicopy count may be entered in the Pause mode.
  Using the Zero/Diamond key displays the total number of copies made.

# [1] Basic specifications

Type:
Desktop
Copying system:
Dry-type electrostatic plain paper copier
Kinds of originals:
Sheets, book, three dimensional objects.
Original size:
10" x 14" (B4), maximum.
Copy size:
(Cassette and manual feed)
10" x 14" to 8½" x 5½" (B4 to A6) universal.
(Cassette feed)
10" x 14" to 8½" x 5½" (B4 to A5).
(Manual feed)
10" x 14" to 8½" x 5½" (B4 to A6).
Copy speed:
(Normal)
8½" x 11" to 8½" x 5½" (A4 to A5): 12 copies/minute
10" x 14" to 8½" (B4): 10 copies/minute
(When in enlargement and reduction)
10" x 14" to 8½" x 5½" (B4 to A5): 10 copies/minute
First copy:
8 seconds.
Warm-up time:
40 seconds at rated voltage and room temperature of more than 68 degrees Fahrenheit (20 degrees centigrades) and relative humidity of 65%.
Multicopying:
1 to 99 copies, 10 key input, countdown type, repeat and pause functions, and multicopy in the Pause mode.
Magnification ratio:
(Inch series)
1:2, 1:1.22, 1:1, 1:0.75, 1:0.64
(Metric series)
1:2, 1:1.22, 1:1, 1:080, 1:0.70
Exposure system:
Slit exposure with moving platen
Paper feed system:
Single 250-sheet cassette automatic paper feed and manual paper feed.
Developing system:
Two component magnetic brush development.
Toner supply:
Automatic toner control system.
Photoconductor:
80$\phi$ OPC drum
Cleaning system:
Blade cleaning
Paper separation system:
Separation sheet method.
Original alignment:
Front side aligned.
Paper transfer system:
Feed roller.
Charge system:
Negative dc corona.
Transfer system:
Negative dc corona.
Discharge system:
Positive dc corona and discharge lamp.
Light source:
Halogen lamp
100V series: 280W
110V series: 280W
120V series: 280W
127V series: 280W
200V series: 280W
Power requirements:
100VAC, 50/60Hz
110VAC, 50/60Hz
120VAC, 60Hz
127VAC, 60Hz
200VAC, 50Hz
220VAC, 50/60Hz
240V, 50Hz
Power consumption:
1.35kW
Fusing system:
Heat roller type
Upper heat roller: Teflon (R) (1150W)
Lower roller: Silicon
Physical dimensions:
530(W) x 490(D) x 345(H)mm
Weight:
About 44kg
Display functions:
Ready (print) indicator (green):
On when the copier is ready for copying.
Preheat indicator (red):
Flashes in the preheat mode.
Multicopy indicator (green):
Displays the number of copies to be made, normally set to "0".
Displays the total copy count or the number of copies already made.
Displays the location of a misfeed in the copier using the silhouette figure.
Displays the status codes, and test command numbers.
Repeat indicator (green):
On in the Repeat mode.
Pause indicator (green):
On in the pause mode.
Paper out indicator (red):
On when the cassette is not loaded or the cassette is out of paper.
Toner indicator (red):
Flashes when the toner box is empty.
The copier stops immediately in the single copy mode.
The copier stops after completing the copy number currently in the multicopy mode.
Maintenance indicator (green): (Flashing Print Switch)
On when scheduled maintenance is required.
Developer indicator (red):
On when the developer replacement period is reached.
Flashes when the life of the developer in the tank expires (15,000 copies).

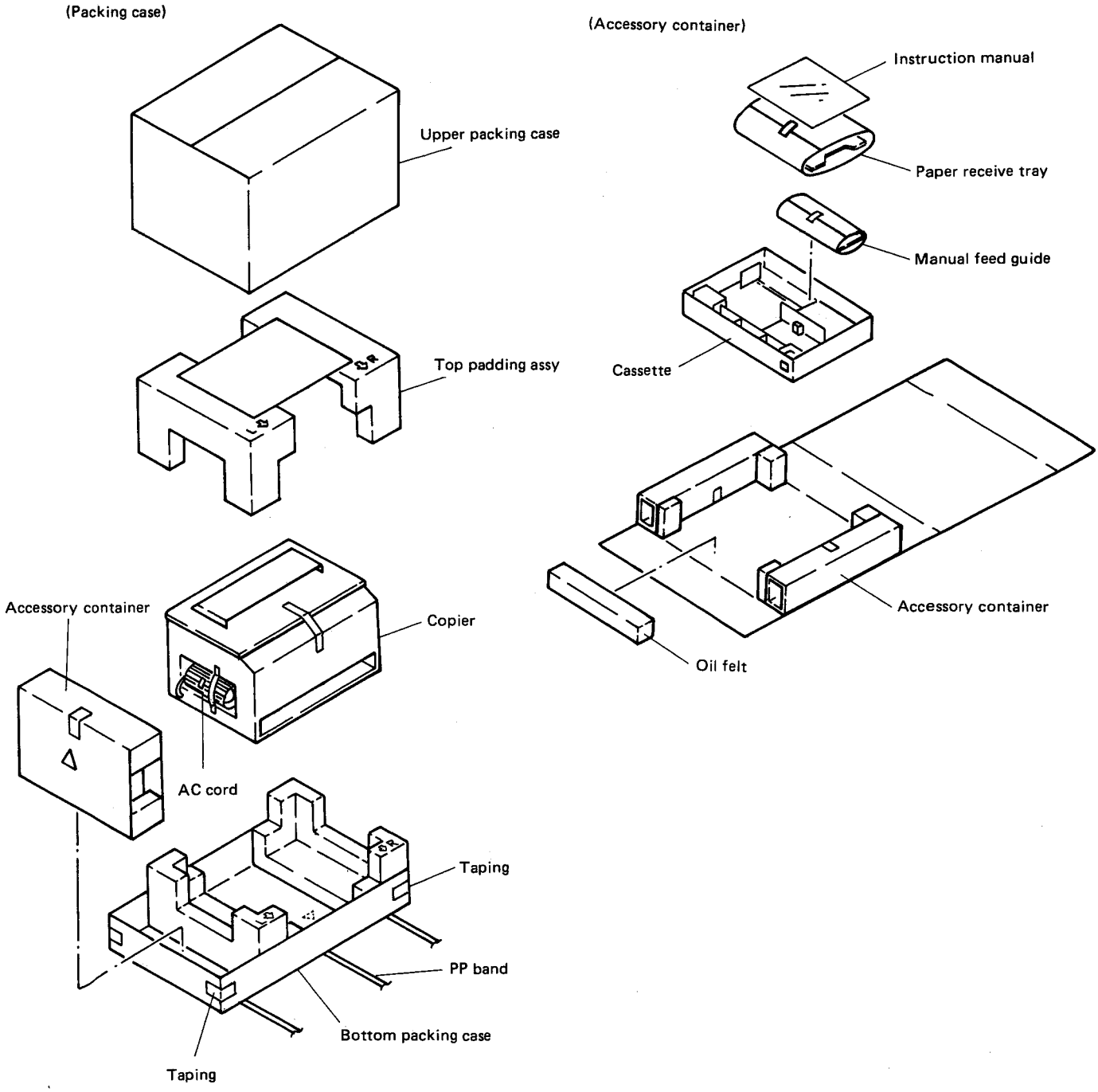
Misfeed indicator (red):
On to indicate a misfeed.
Misfeed location indicator:
Indicates, on the multicopy display, the location of a misfeed, using sihouette figure.
Auto exposure indicator (green):
On when the automatic exposure function is active.
Toner collector full indicator (red):
Flashes when the toner collector is full.
The copier stops immediately in the single copy mode.
The copier stops after completing the copy number currently in the multicopy mode.
Magnification display:
Indicates the chosen magnification ratio.
Accessories:
Universal cassette (w/o cassette cover) x 1
Copy tray
Charger cleaner
Charger brush
Manual feed guide
Instruction manual
Warranty form (SCA only)
Dust cover (part of Africa and Middle East only)
Options:
Universal cassette with cover (SF720UA: Inch, SF720UB: AB)
Cabinet (SF720D)
Personal counter [SF71B (socket), SF-71A (counter)]

# [2] Unpacking and installation

## 1. Unpacking

### (1) Open the carton in the following sequence.

① Cut the PP bands.
② Remove the upper packing case.
③ Remove the top padding assy.
④ Remove the tape that holds the four corners of the bottom case, then open the bottom case.
⑤ Remove the copier body from the bottom case.



## 2. Installation

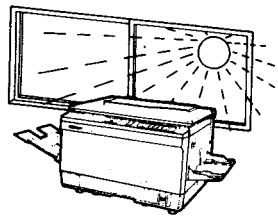
Installation requirements

Please note the following requirements when installing the copier.

### (1) Machine environment

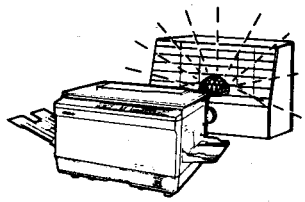
① Avoid installation in direct sunlight or bright locations near a window.

Direct sunlight may cause the plastic components and the original cover to deform. Frosted glass may also produce the same effect.

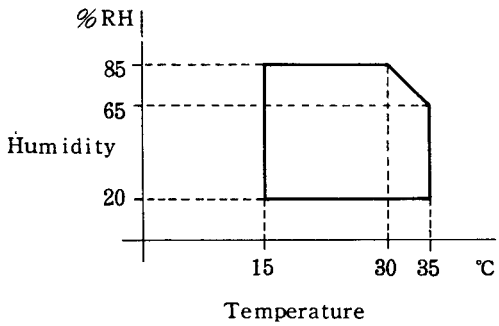


② Avoid installation in a hot, damp place or where rapid changes in humidity occur (for example; near an air conditioner).

This may cause paper to dampen or frost to occur inside the copier, and may lead to a misfeed and a deterioration in the copy quality.



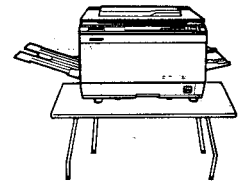
The recommended environmental conditions are:
20 to 25°C (68 to 77°F), 65% ± 5%RH
The nominal environmental conditions are:
15 to 30°C (59 to 86°F), 20 to 85%RH.
If the copier is to be installed in an area of higher temperature the humidity should be lower. Example; If the temperature is 35°C (95°F), the humidity should be 65%.




③ Avoid installation in a place where dust or vibration is encountered.

Dust deposit inside the copier may lead to a deterioration of copy quality or machine trouble.

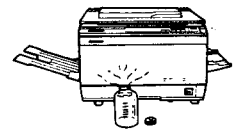
④ Do not install the copier on an unstable or uneven surface. The copier must be placed on a level surface to permit proper functioning.



⑤ Avoid installation in a place where ventilation or air circulation is poor.

⑥ Never install the copier near inflammable materials or in the presence of ammonia gas.

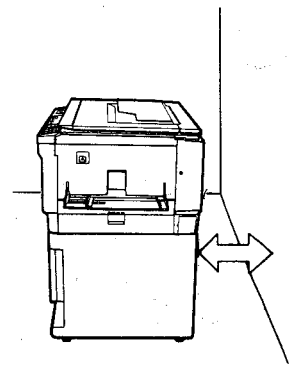
Installation near a diazo copy machine may lead to a deterioration of copy quality or a machine malfunction.



⑦ Install the copier near the wall outlet.

### (2) Space around the copier

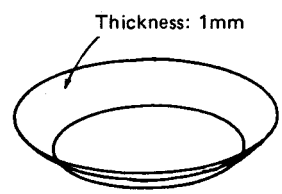
The copier requires at least 10cm of clearance between the rear side and the wall. This space is required for proper cooling fan ventilation. Adequate working space around the machine should also be allowed for ease of operation.



### (3) Copier table

Install the machine on a level surface. Place a water level in the center of original glass and check level front to rear and side to side. Use as many adjusting shims as required until the copier is level.

NOTE: The parts code of the water level is UKOGM0054-CCZZ.




Height adjusting shim
(PSRA-0002FCZZ)

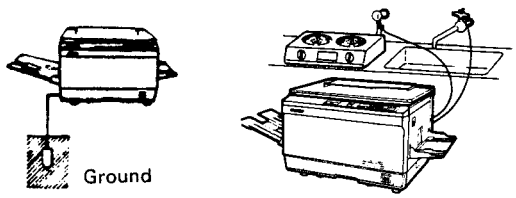
NOTE: The toner density and copy quality may be affected unless the machine is installed in a level condition.

### (4) Power source

① The power supply line should have a capacity of more than 15A, capable of supplying more than 90% of the rated voltage at full load.
② Do not use an extension cord or operate any other equipment from the same wall outlet.

### (5) Ground connection

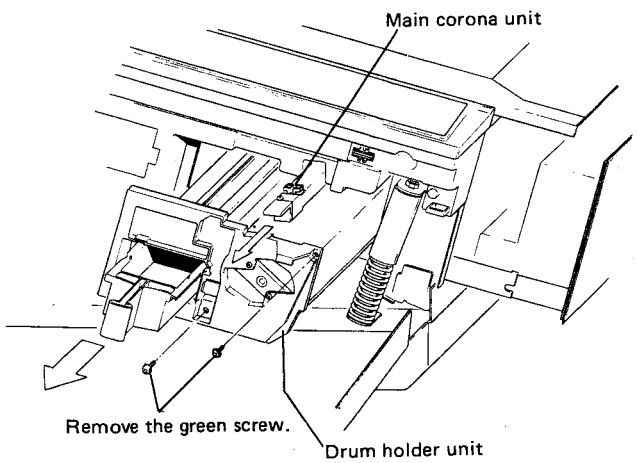
① Use a properly grounded (three prong) wall outlet only.
② Wall outlet must be properly grounded.
③ Connect the ground cable to an authorized ground line connected to a copper bar more than 65cm (25.6") buried underground, but never connect it to a gas line.



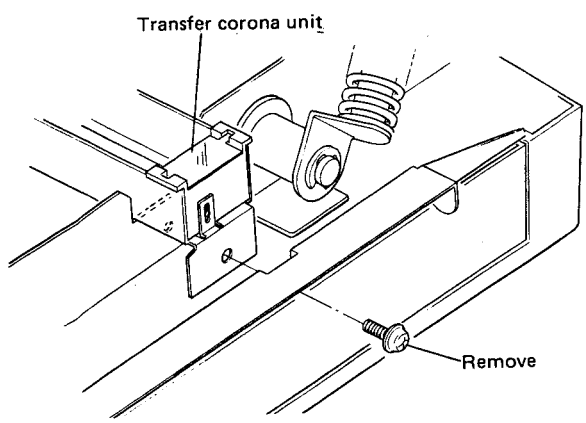

## 3. Installing Supplies and Components

### (1) Cleaning the corona wire

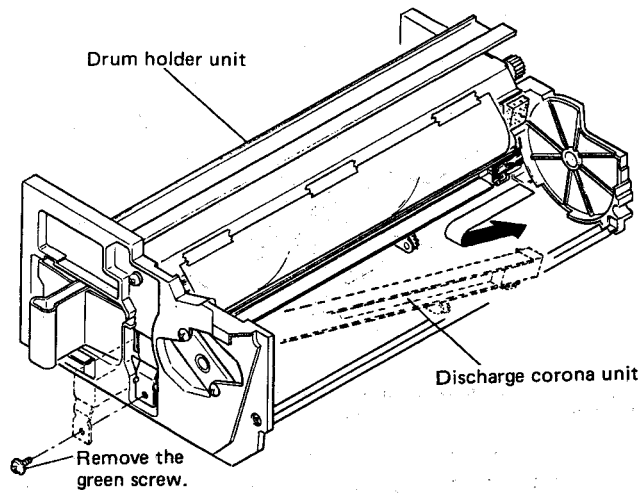
① Unlock the developing unit access cover lock lever, and remove the developing unit.
② Open the clam shell.
③ Remove the drum holder unit from the copier.




④ Remove the transfer corona unit.



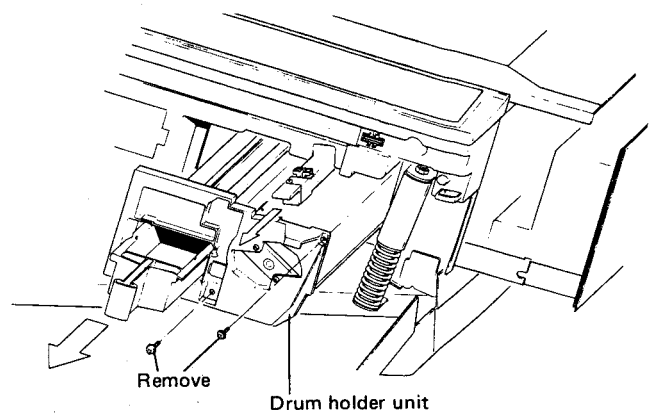

⑤ Remove the discharge corona unit.
NOTE: Use Caution to avoid drum damage.



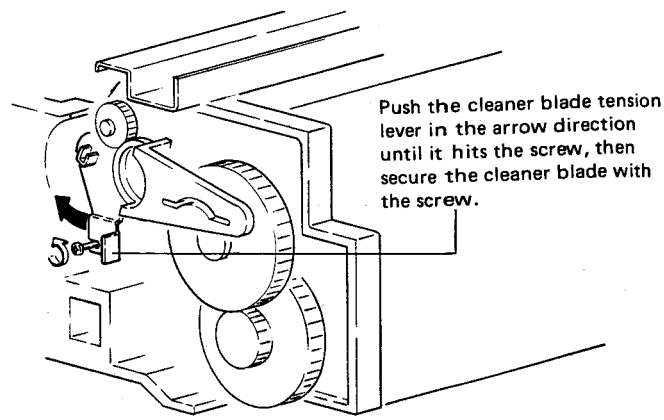

⑥ Clean the corona wire with the corona wire cleaner.

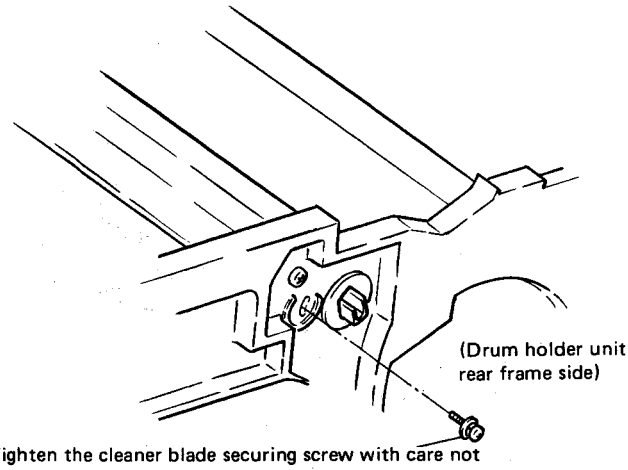
### (2) Installing the drum and the cleaner blade

(1) Unlock the developing unit access cover lock lever, and remove the developing unit.
(2) Open the clam shell.
(3) Remove the drum holder unit from the copier.




(4) Remove the cleaner blade tension screw to release the cleaner blade tension and remove the blade cover. (2 screw)

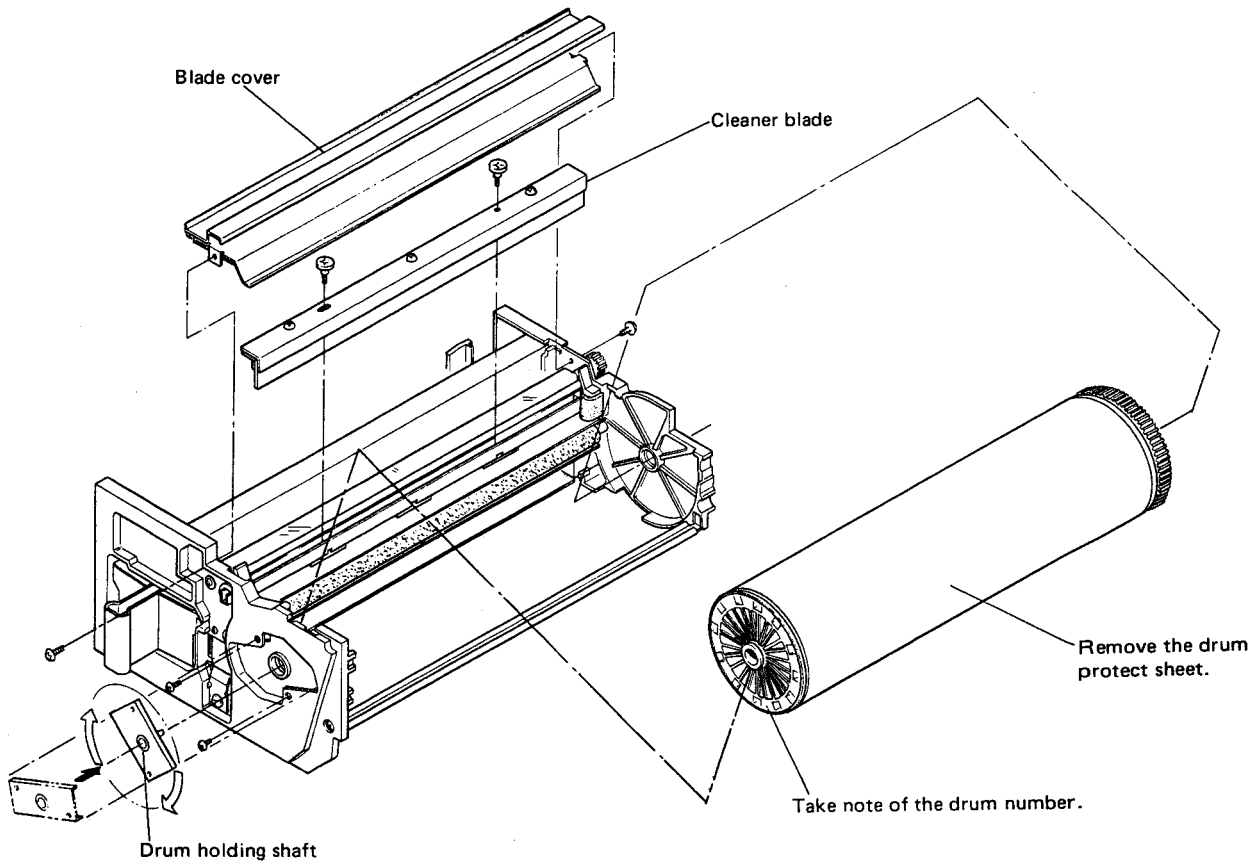

Push the cleaner blade tension lever in the arrow direction until it hits the screw, then secure the cleaner blade with the screw.
(Drum holder unit front frame side)




Tighten the cleaner blade securing screw with care not to move the cleaner blade holding shaft.

⑤ Remove the drum holding shaft from the drum holder unit. To remove the drum holding shaft, remove two screws that secure the drum unit, and turn the shaft counterclockwise, then pull the unit out.

⑥ Install the cleaner blade to the drum holder unit cleaner shaft and replace the Blade Cover.

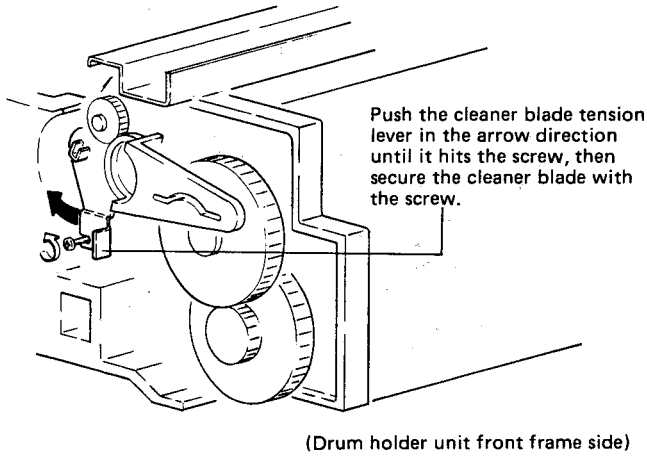


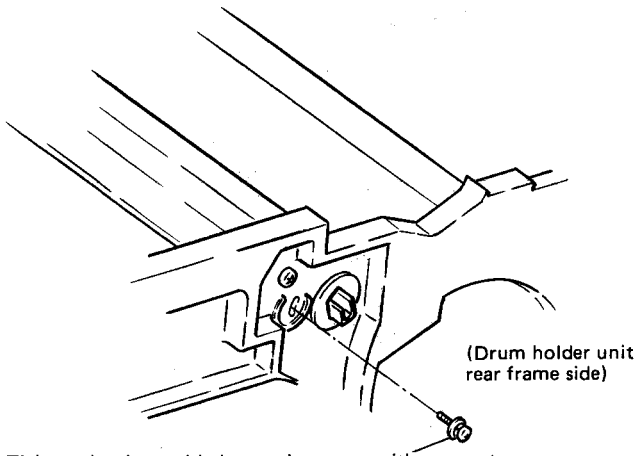

⑦ Take note of the drum number on the front frame end of the drum.

⑧ Peel away the drum protection sheet from the drum surface and mount the drum in the drum unit.

NOTE: The white powder found on the cleaning blade and the drum surface is used to reduce friction between these two parts. Do not remove the white powder. Replace the drum holding shaft in the drum holder unit.

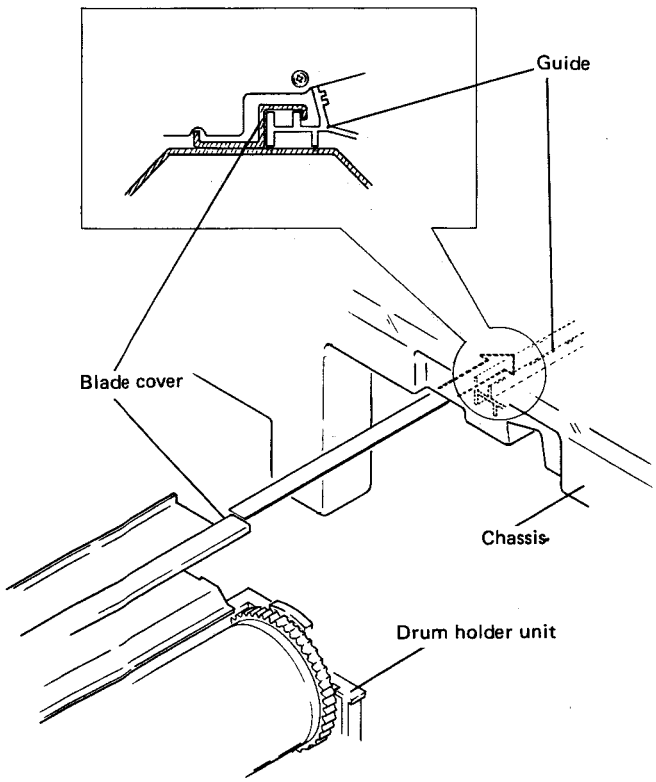
⑨ Apply tension to the cleaner blade.


Push the cleaner blade tension lever in the arrow direction until it hits the screw, then secure the cleaner blade with the screw.
(Drum holder unit front frame side)

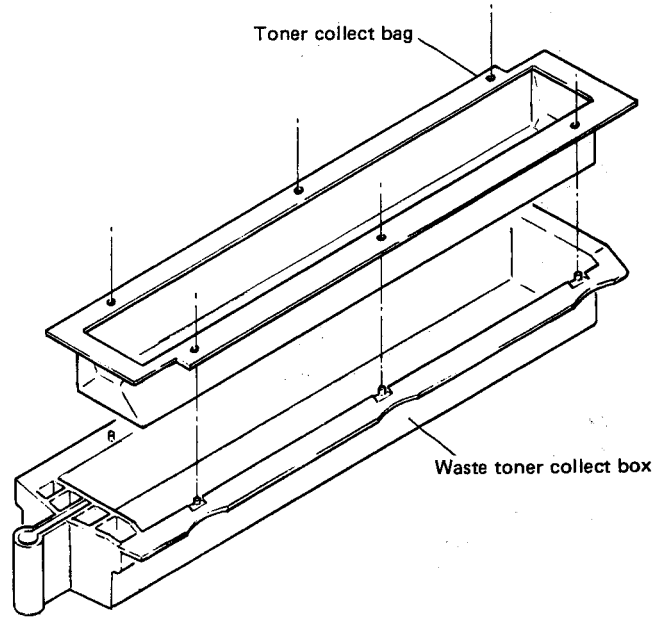



Tighten the cleaner blade securing screw with care not to move the cleaner blade holding shaft.

⑩ Install the drum holder unit along the guide.



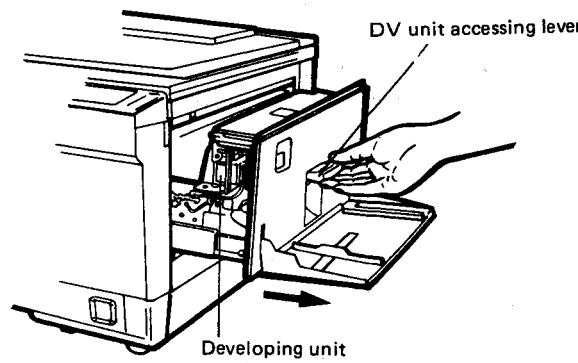

⑪ Install the toner collect bag to the waste toner collect box. Open the toner collect bag to install.



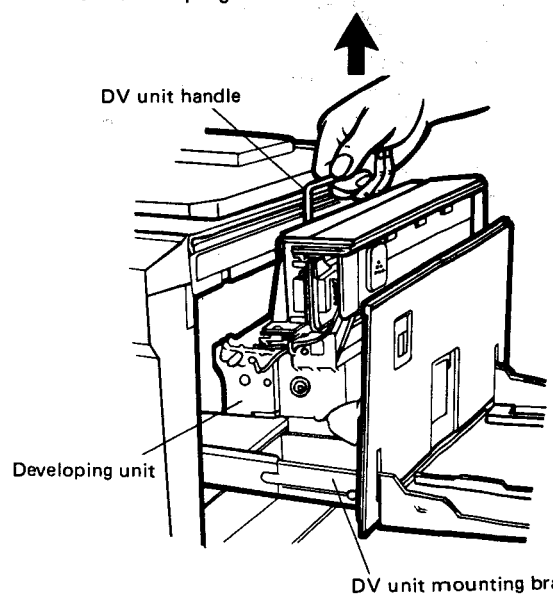

⑫ Install the toner collect container.

### (3) Installing the developer and toner

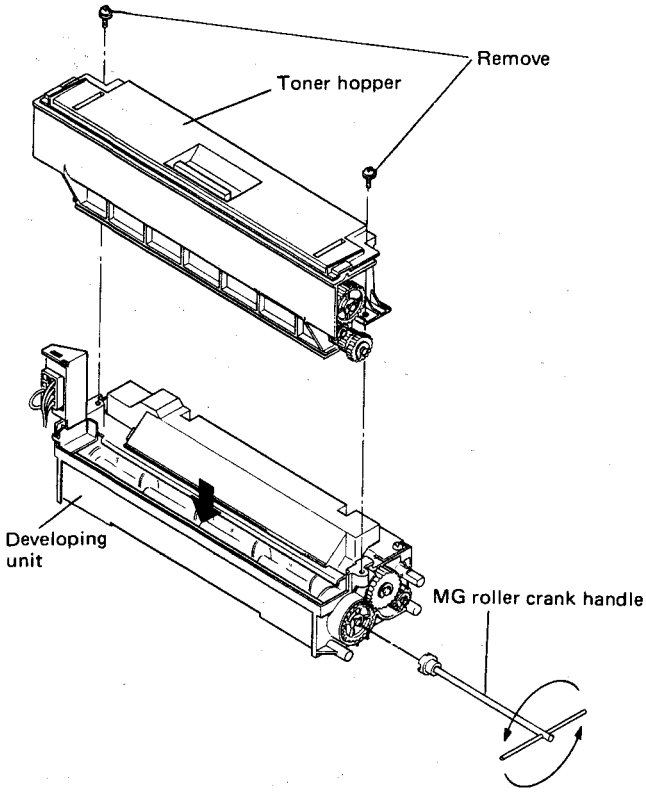
① Release the developing unit lock lever and pull out the developing unit.



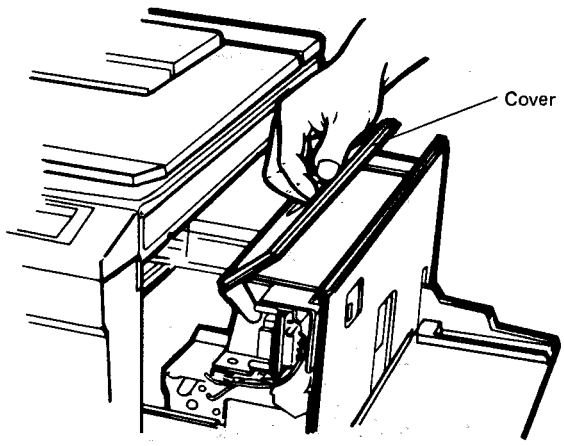

② Hold the developing unit handle and lift it out from the developing unit mount.



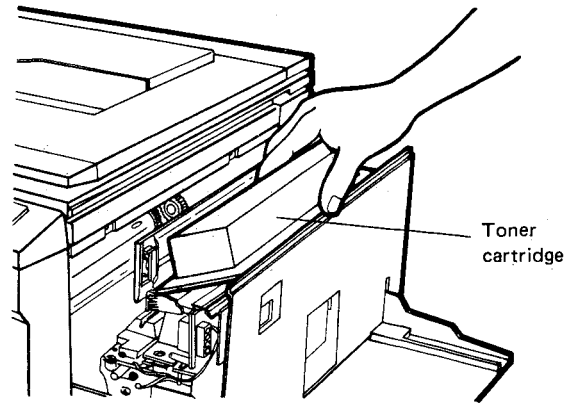
③ Remove the toner hopper from the developing unit.
④ Pour an entire bottle of the developer into the developing unit while rotating the MG gear counterclockwise. Use the MG crank handle UKOG-0091CSZZ.



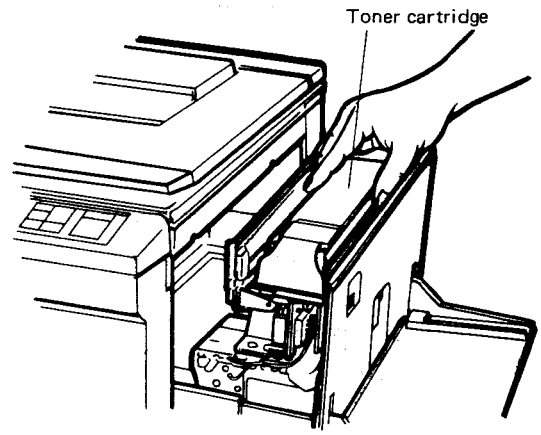

⑤ Replace the toner hopper on the developing unit.
⑥ Place the developing unit on the developing unit mount.
⑦ Open the toner hopper cover and set the toner cartridge on the toner hopper.



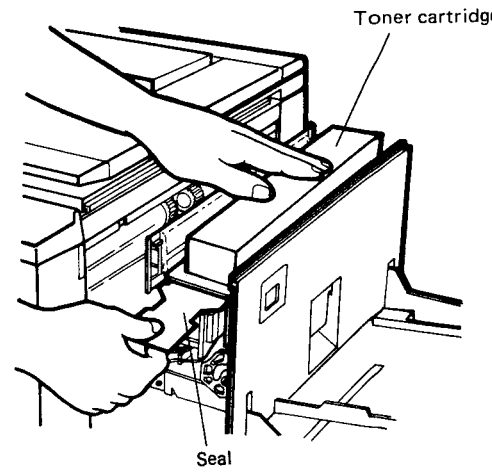

(Open the toner hopper cover)




(Installing the toner cartridge)




⑧ Evenly load the contents of the toner cartridge into the toner hopper.
Lightly tap the toner cartridge in order to empty all the toner contents.

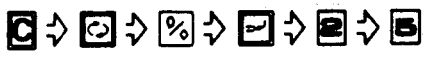



⑨ Remove the toner cartridge and close the toner hopper cover.
⑩ Close the developing unit mount, and set the developing unit lock lever to locked position.

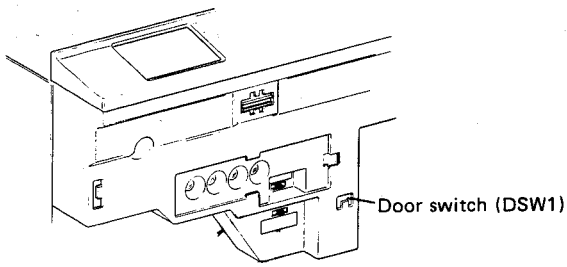
### (4) DV sensor level adjustment

① Manually actuate the doorswitch (DSW) and turn on the power.

② Execute test command 25 to stir the developer for a period of one minute.
(Test command execution procedure)

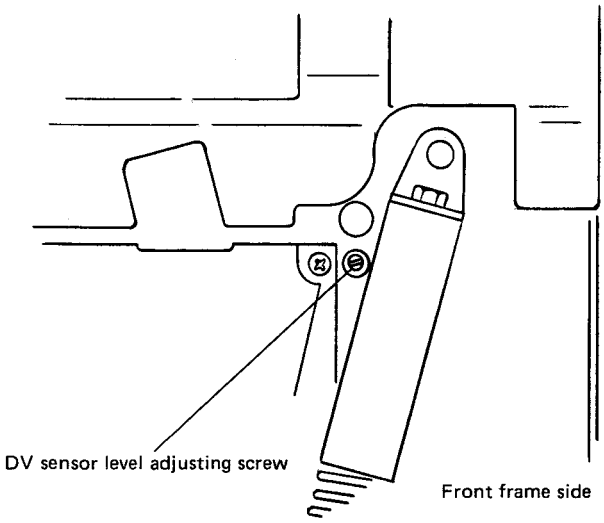



③ Manually actuate the doorswitch (DSW) and press the PSW key. The test command 25 now starts to execute to stir the developer for one minute.



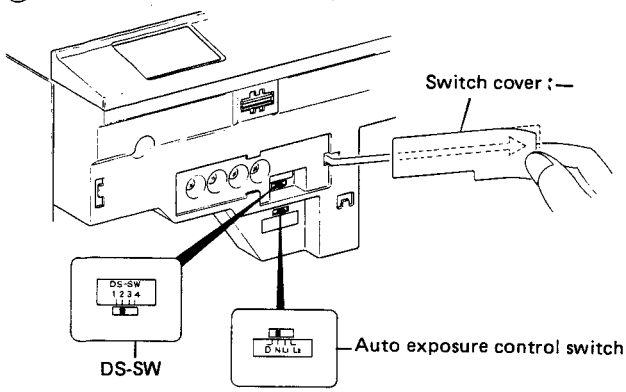

④ After stirring the developer for one minute, press the PSW key to perform test command 25 once more. Turn the DV sensor level adjusting screw clockwise until the toner empty lamp (TEL) activates.

⑤ Slowly turn the DV sensor level adjusting screw clockwise and stop when the TEL goes out.



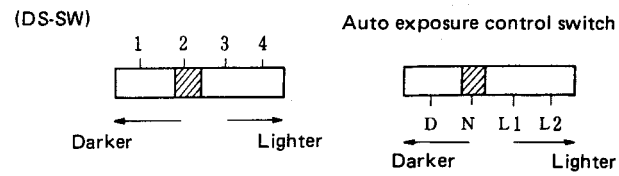

### (5) Setting drum sensitivity

① Remove the drum sensitivity switch (DSSW) cover.




② Set the DSSW position to the first digit of the drum number noted before.
Example:
If the drum number is 2B1984, set the DSSW to "2".

③ Set the auto exposure control switch to the "N" (normal) position.

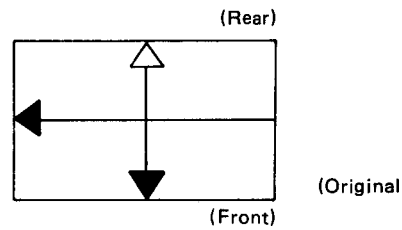


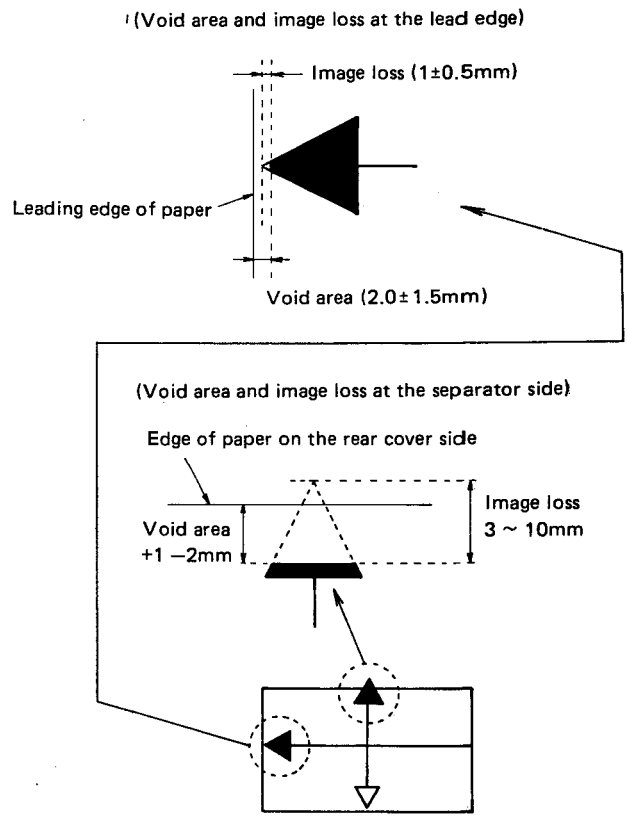

NOTE: Copy density may vary depending on the position of the DS-SW and the auto exposure control switch.

## 4. Copy Tests

### (1) Void area and image loss

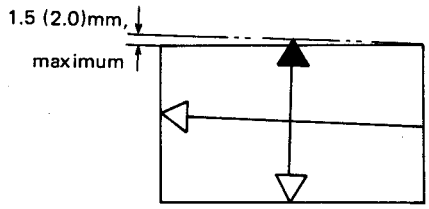
Make copies in every magnification ratio to ensure that void area and image loss are within the given limits.





(Void area and image loss at the lead edge)
Image loss (1±0.5mm)
Leading edge of paper
Void area (2.0±1.5mm)
(Void area and image loss at the separator side)
Edge of paper on the rear cover side
Void area
+1 −2mm
Image loss
3 ~ 10mm

### (2) Skew

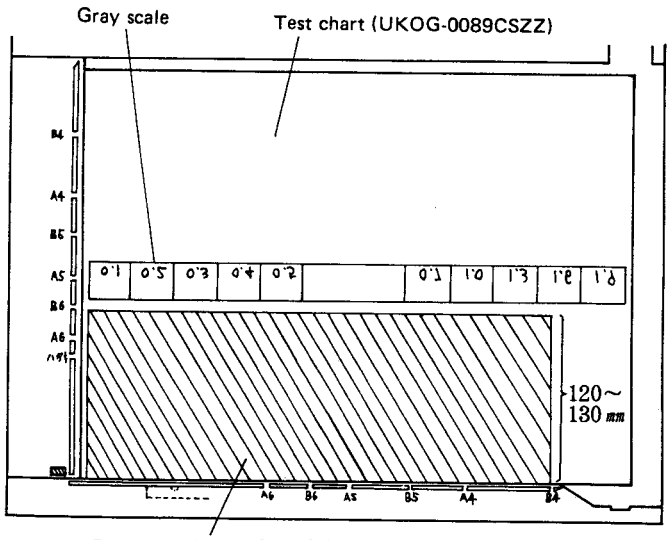
Make a copy on B4 (10" x 14") paper and ensure that a skew is within the given limits.
1.5mm or less (during cassette feed)
2.0mm or less (during manual feed)




### (3) Copy density

Check the copy density in the following manner:

① Place four sheets of blank white paper, 120mm x 360mm, on top of each other in alignment with the original set mark on the front frame side of the original table, and place the test chart (UKOG-0089CSZZ) on it, so that the gray scale portion of the test chart is copied.




Place two sheets of twofold blank white paper of 10" x 14" (A4) size.

② Make one copy of the normal size and one copy of "1:2.0" size in the manual exposure mode at 5. Ensure that the gray scale strip 0.5 appears slightly foggy. (KODAK gray scale: 4.0 strip)

③ Make a normal size copy in the manual exposure mode at 1. Ensure that the gray scale 0.1 appears slightly copied. (KODAK gray scale: 1 strip)

④ Make a copy in the "1:2.0" size in the enlarge mode. Ensure that the gray scale 0.1 appears copied. (KODAK gray scale: A or 1 strip)

⑤ Make one copy of the normal size one copy of "1:2.0" size in the manual exposure mode at 2.0.

⑥ Make one copy of the normal size and the "1:2.0" size in the automatic exposure mode. Ensure that they have the same copy density as the ones made under the exposure setting of 2.0.

### (4) Resolution

Make one copy of the test chart (UKOG-0089CSZZ) at every magnification ratio. Make sure that their resolutions are within the given limits below.
Center/Corner
Normal: 5 lines/mm 4.5 lines/mm
Enlarged: 4.5 lines/mm 4 lines/mm
Reduced: 3.6 lines/mm 3.2 lines/mm

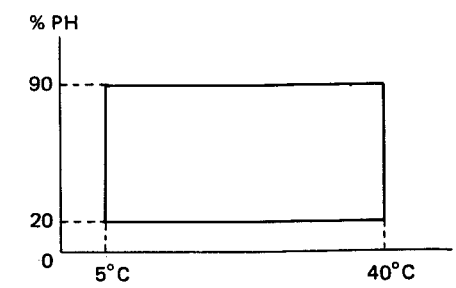
## 5. Automatic Preheat and Function Preset

As the SF-7200 permits selection of the automatic on/off function, the following command entry should be observed to assign or cancel the automatic preheat function. The automatic preheat function has not been assigned when the copier left the factory.
Press the following sequence of keys:
[Clear] → [Repeat] → [Zero] → [Pause] → [6] → [6] → keys.
If the PDPL is active, it indicates the assignment of the auto power down mode. If not active, it indicates the auto power down mode is not assigned.
To set the auto power down mode active, press the power down key after the above operation to make the PDPL active, then press the PSW key.
To clear the auto power down mode, press the power down key after the above operation to make the PDPL deactive, then press the PSW key.

# [3] Supplies

## 1. Developer, Toner, Drum

| Name | | Contents | Life | |
|---|---|---|---|---|
| Developer | (Black) | Developer x 1 | 15,000 | SF-720DV1 |
| | (Red) | Developer x 1 | 7,500 | SF-720DV2 |
| | (Blue) | Developer x 1 | 7,500 | SF-720DV3 |
| | (Brown) | Developer x 1 | 7,500 | SF-720DV4 |
| Toner cartridge | (Black) | Toner cartridge x 1 (110g) | 2,000 | SF-720T1 |
| | (Red) | Toner cartridge x 1 | 2,000 | SF-720T2 |
| | (Blue) | Toner cartridge x 1 | 2,000 | SF-720T3 |
| | (Brown) | Toner cartridge x 1 | 2,000 | SF-720T4 |
| Drum unit | | Drum x 1<br>Drum blade x 1<br>Toner collect bag x 4<br>Remover tape x 1 | 15,000 | SF-720DR |
| Developing kit | (Red) | Developer tank container x 1<br>Developer tank x 1<br>Developer x 1<br>Toner (500 copies) x 1 | | SF-720K2 |
| | (Blue) | | | SF-720K3 |
| | (Brown) | | | SF-720K4 |
| Heat roller kit | | Upper heat roller x 1<br>Lower heat roller x 1<br>Separater pawl (Upper) x 3 | 60,000 | SF-720HR |
| Cleaning roller kit | | Cleaning roller x 2 | 15,000 | SF-720RL |

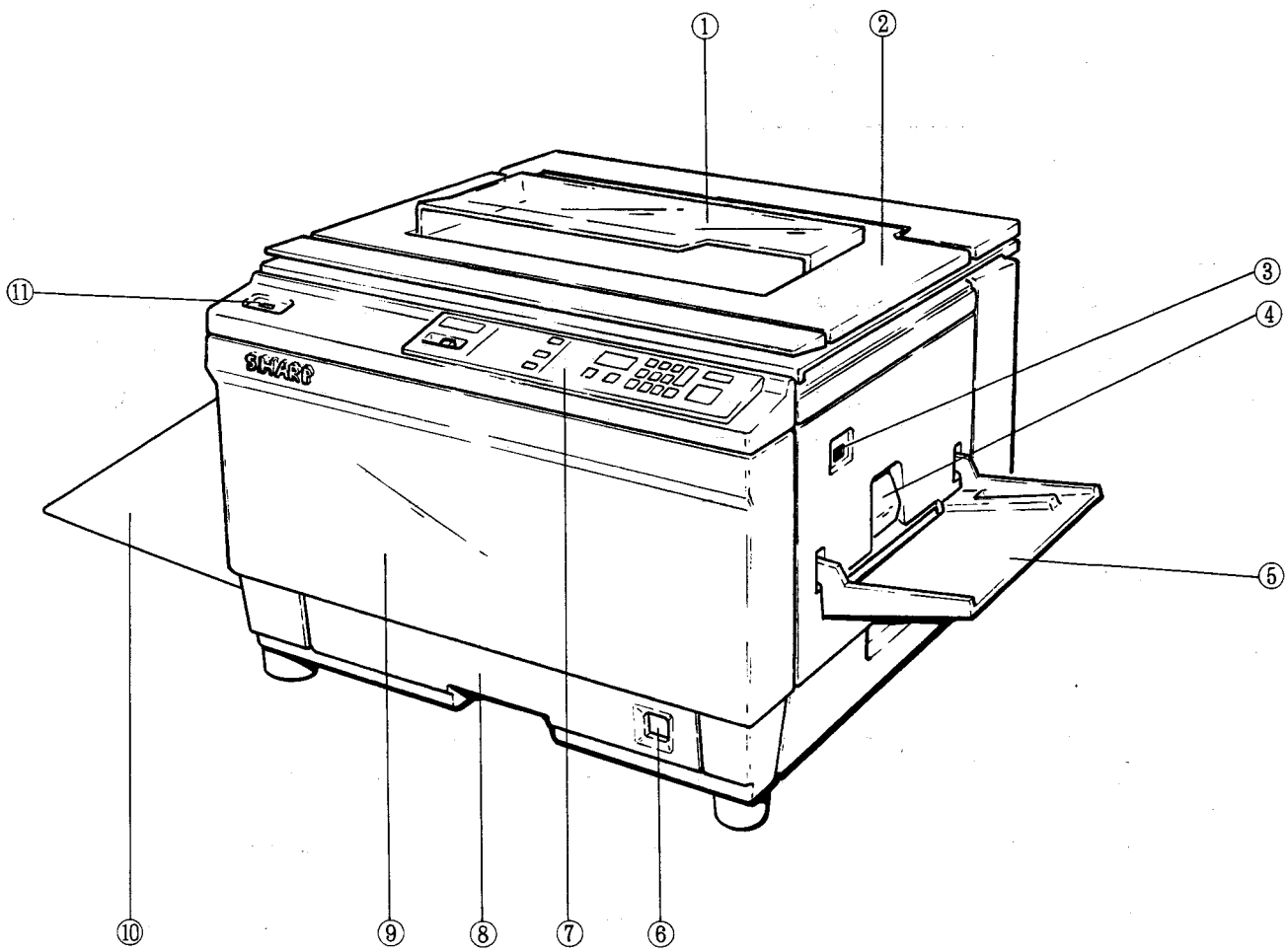
| | Life | Storage period | Storage environment |
|---|---|---|---|
| Drum | 15000 copies | 24 months (From production month) |  |
| Developer | 15000 copies (800g) | 24 months (From production month) | |
| Toner | 7500 copies (90g) for black, red, and blue for A4 or letter size with 6% toned area. | 24 months (From production month) | |



(All items must be unopened.)

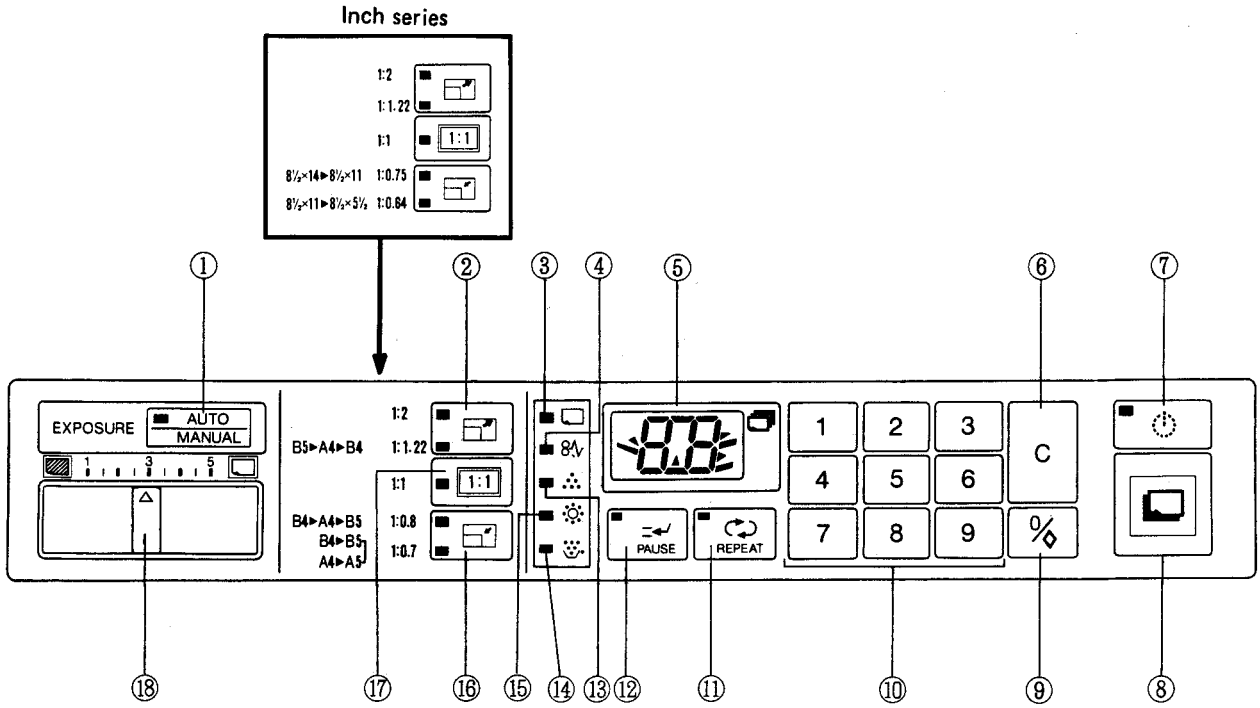
# [4] External and internal structure

## 1. External Structure



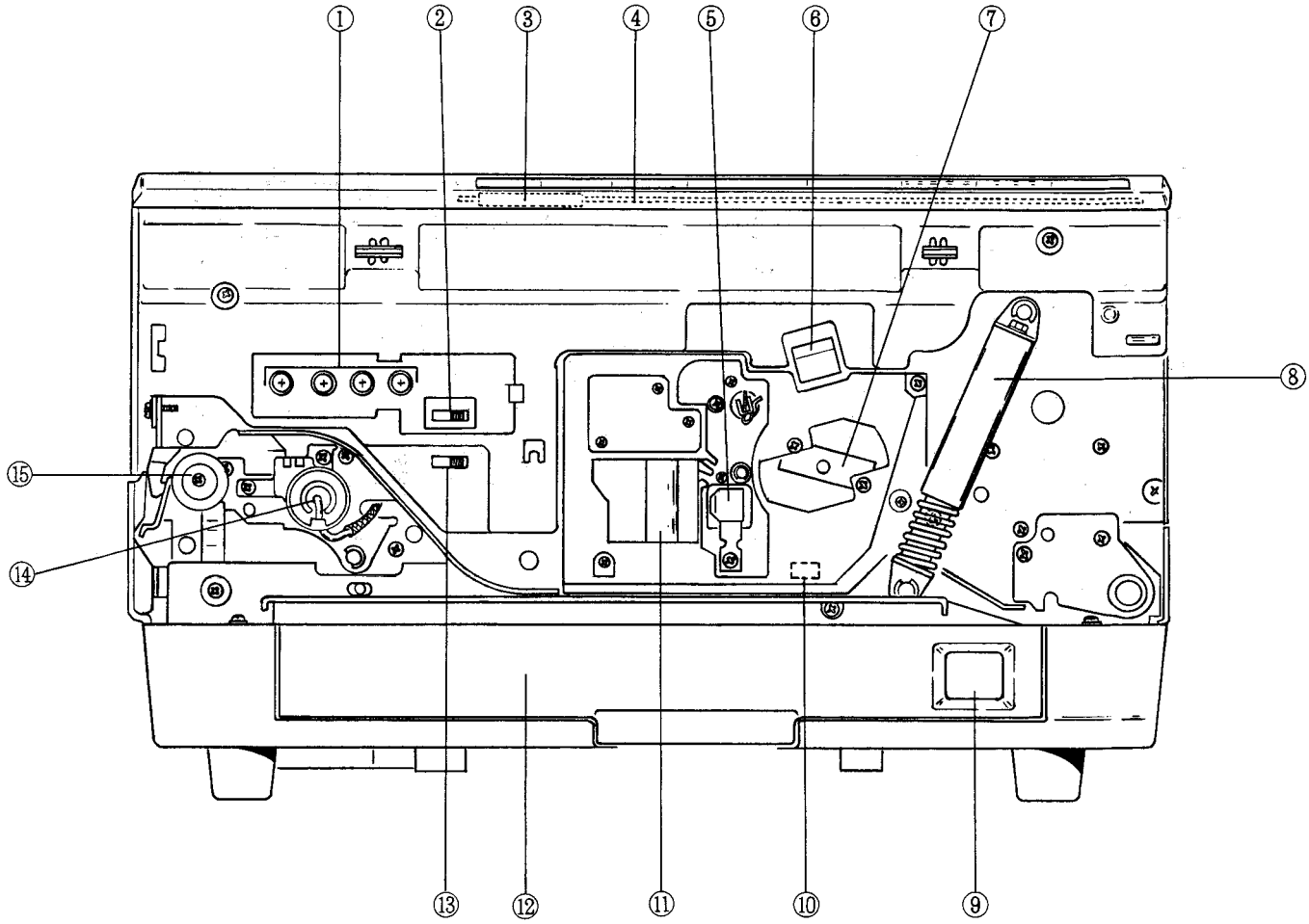

| | | | | | |
|---|---|---|---|---|---|
| ① | Original stack | ② | Original cover | ③ | Color check window |
| ④ | Developing unit cover open/close lever | ⑤ | Manual feed tray | ⑥ | Paper size indicator |
| ⑦ | Operation panel | ⑧ | Cassette | ⑨ | Front cover |
| ⑩ | Receiving tray | ⑪ | Clip tray | | |

## 2. Operation panel



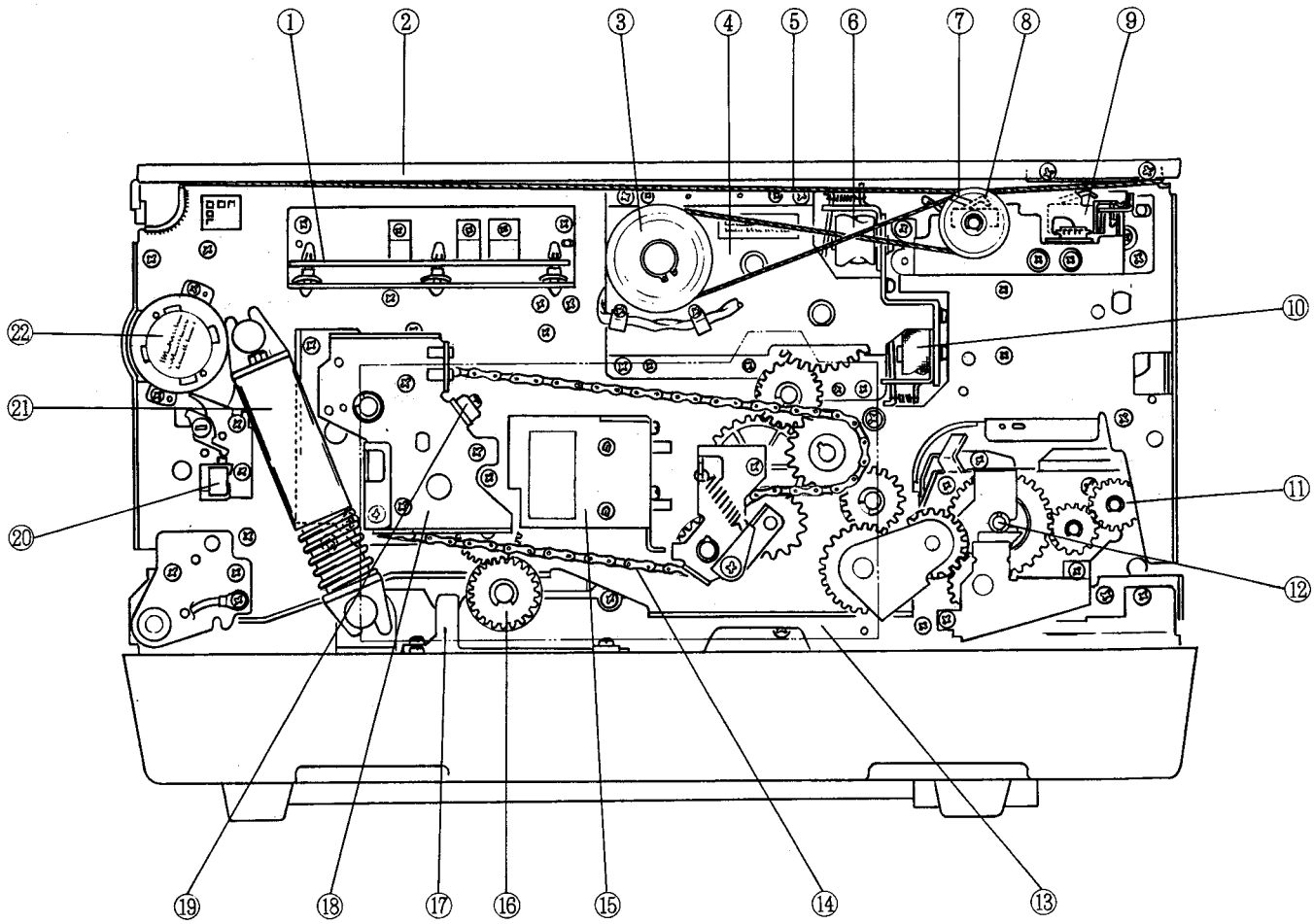

| | | | | | |
|---|---|---|---|---|---|
| ① | Automatic Exposure Selector Key | ② | Enlargement Key | ③ | Paper Supply Lamp |
| ④ | Misfeed Lamp | ⑤ | Copy Counter | ⑥ | Clear Key |
| ⑦ | Power Save Key | ⑧ | Print Button | ⑨ | Zero/Readout Key |
| ⑩ | Number Keys | ⑪ | Repeat Key | ⑫ | Pause Key |
| ⑬ | Toner Replenishment Lamp | ⑭ | Toner Collection Lamp | ⑮ | Developer Replacement Lamp |
| ⑯ | Reduction Key | ⑰ | Same Size Key | ⑱ | Exposure Control Lever |

## 3. Front Side



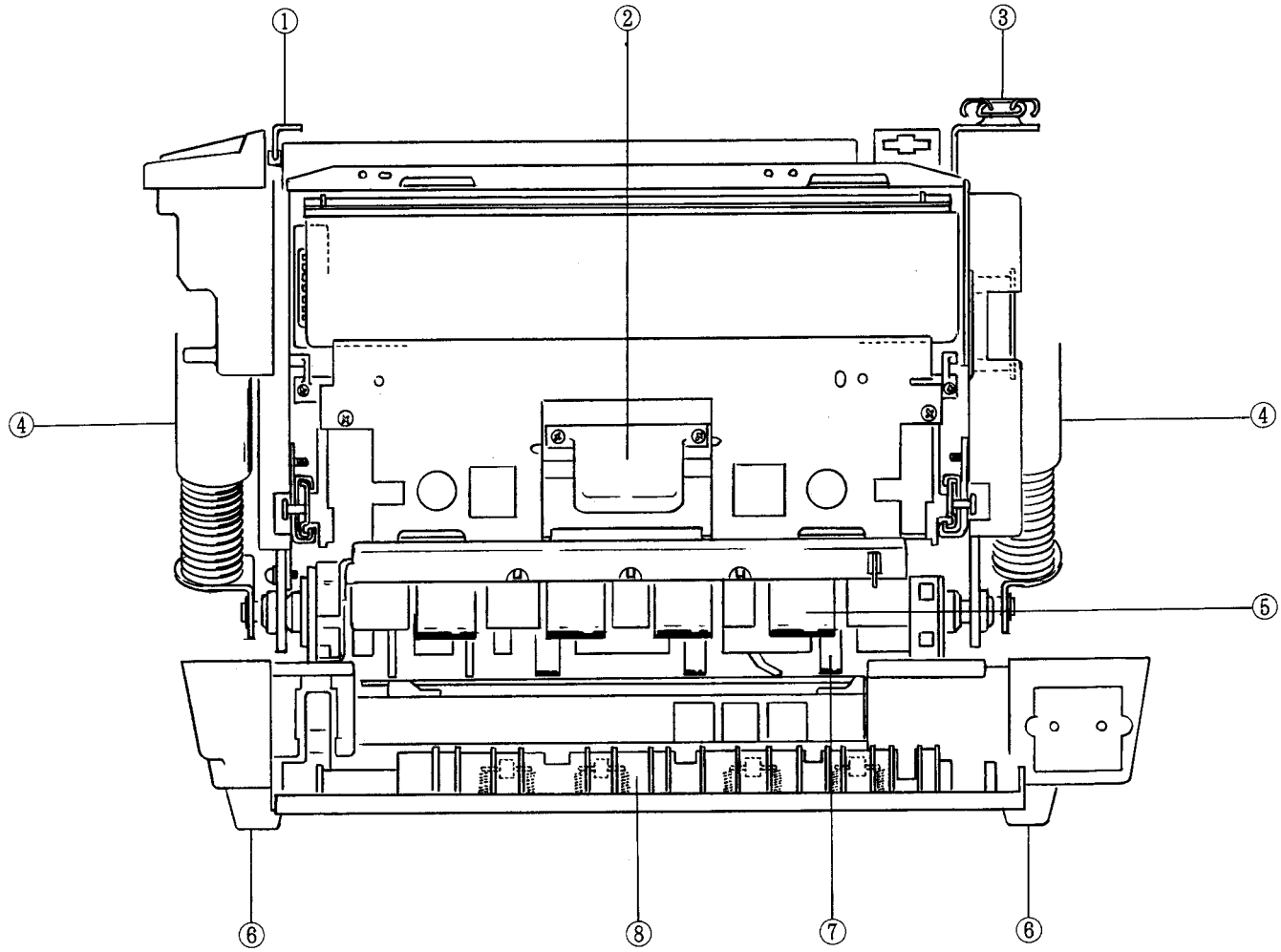

| | | | | | |
|---|---|---|---|---|---|
| ① | Copy lamp intensity regulating pot | ② | Drum sensitivity select switch (DS-SW) | ③ | Exposure control pot |
| ④ | Operation PWB | ⑤ | Discharge corona | ⑥ | Main corona |
| ⑦ | Drum holding shaft | ⑧ | Balancer | ⑨ | Paper size indicator |
| ⑩ | Transfer corona | ⑪ | Toner collect container | ⑫ | Cassette |
| ⑬ | Automatic exposure correction switch | ⑭ | Heater lamp | ⑮ | Manual fusing roller handle |

## 4. Rear Side



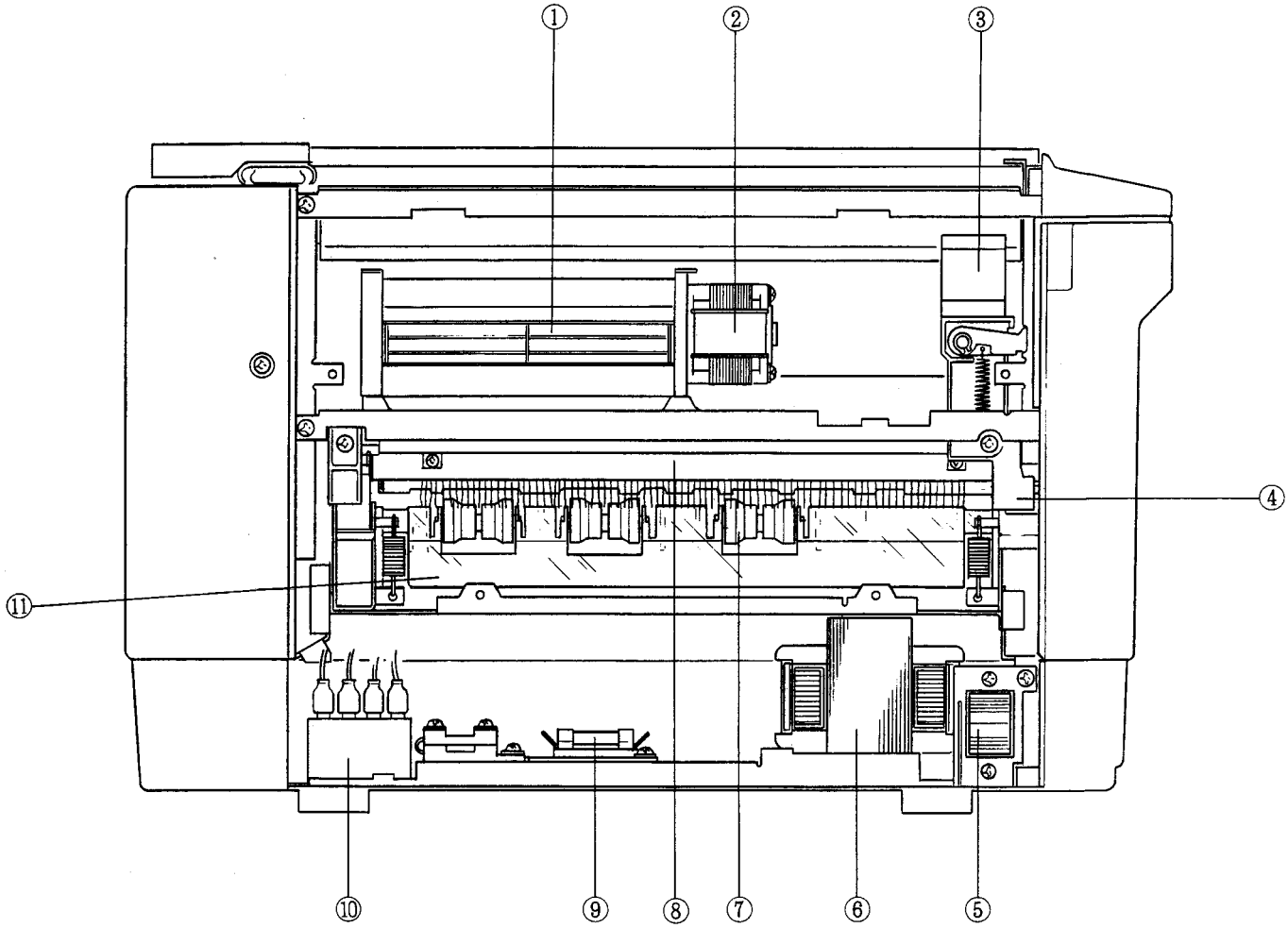

| | | | | | |
|---|---|---|---|---|---|
| ① | DC power supply PWB | ② | Original table | ③ | Drive pulley |
| ④ | Table drive unit | ⑤ | Table drive wire | ⑥ | Table speed select solenoid |
| ⑦ | MS7 (rear cover side) | ⑧ | MS5 | ⑨ | MS6 |
| ⑩ | Table speed select solenoid | ⑪ | Paper delivery roller drive gear | ⑫ | Heater lamp |
| ⑬ | Main PWB | ⑭ | Drive train | ⑮ | High voltage units (main, discharge) |
| ⑯ | Separator gear | ⑰ | High voltage transfer unit | ⑱ | Drive unit |
| ⑲ | Drive unit rotation sensor (PT sensor) | ⑳ | DSW3 | ㉑ | Balancer |
| ㉒ | Toner motor | | | | |

## 5. Right Side (paper entry)



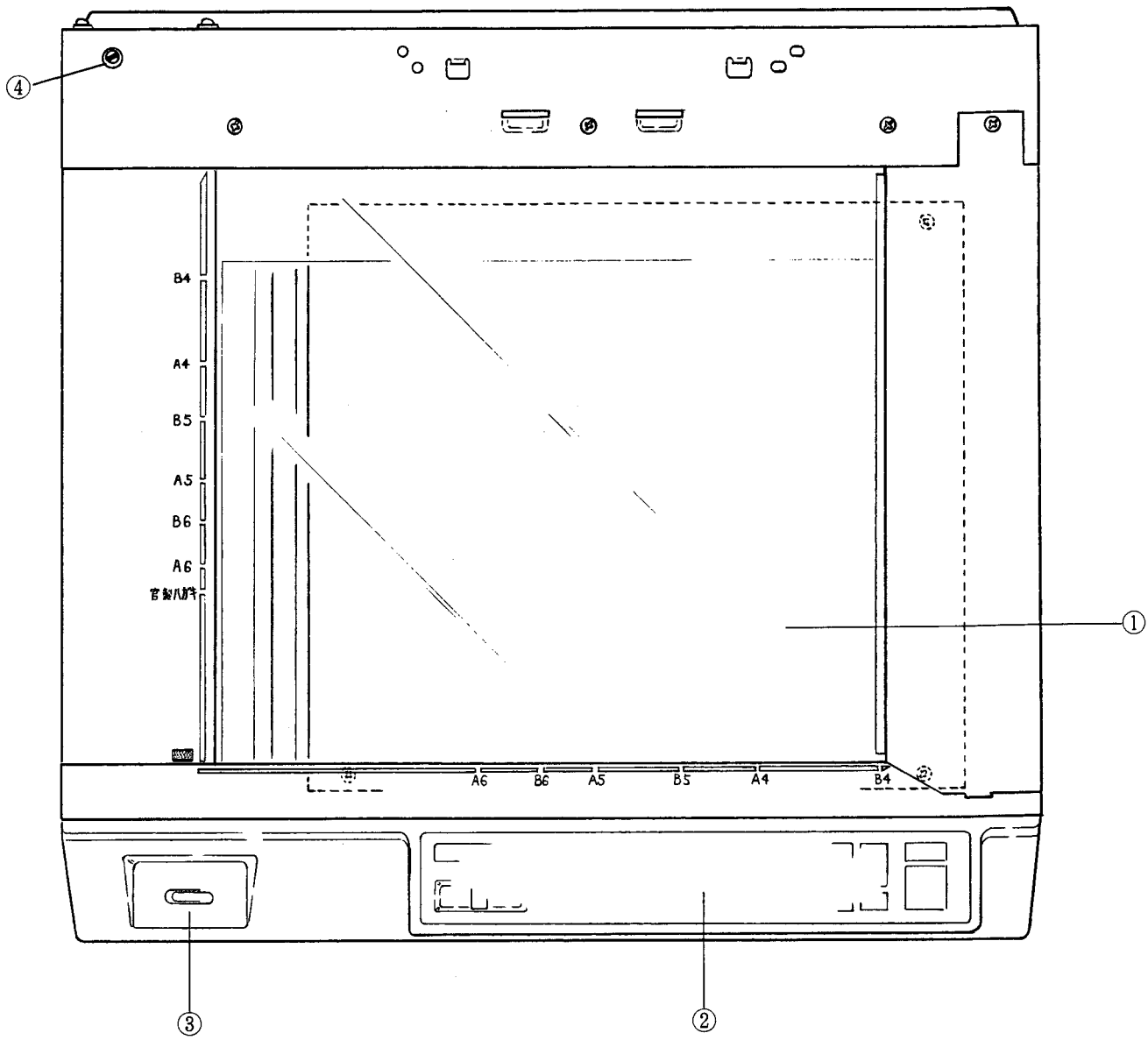

| | | | | | |
|---|---|---|---|---|---|
| ① | Table guide | ② | Developing unit open/close lever | ③ | Rail |
| ④ | Balancer | ⑤ | Paper feed roller, B | ⑥ | Rubber footing |
| ⑦ | Paper feed roller, A | ⑧ | U-turn guide | | |

## 6. Left Side (paper exit)



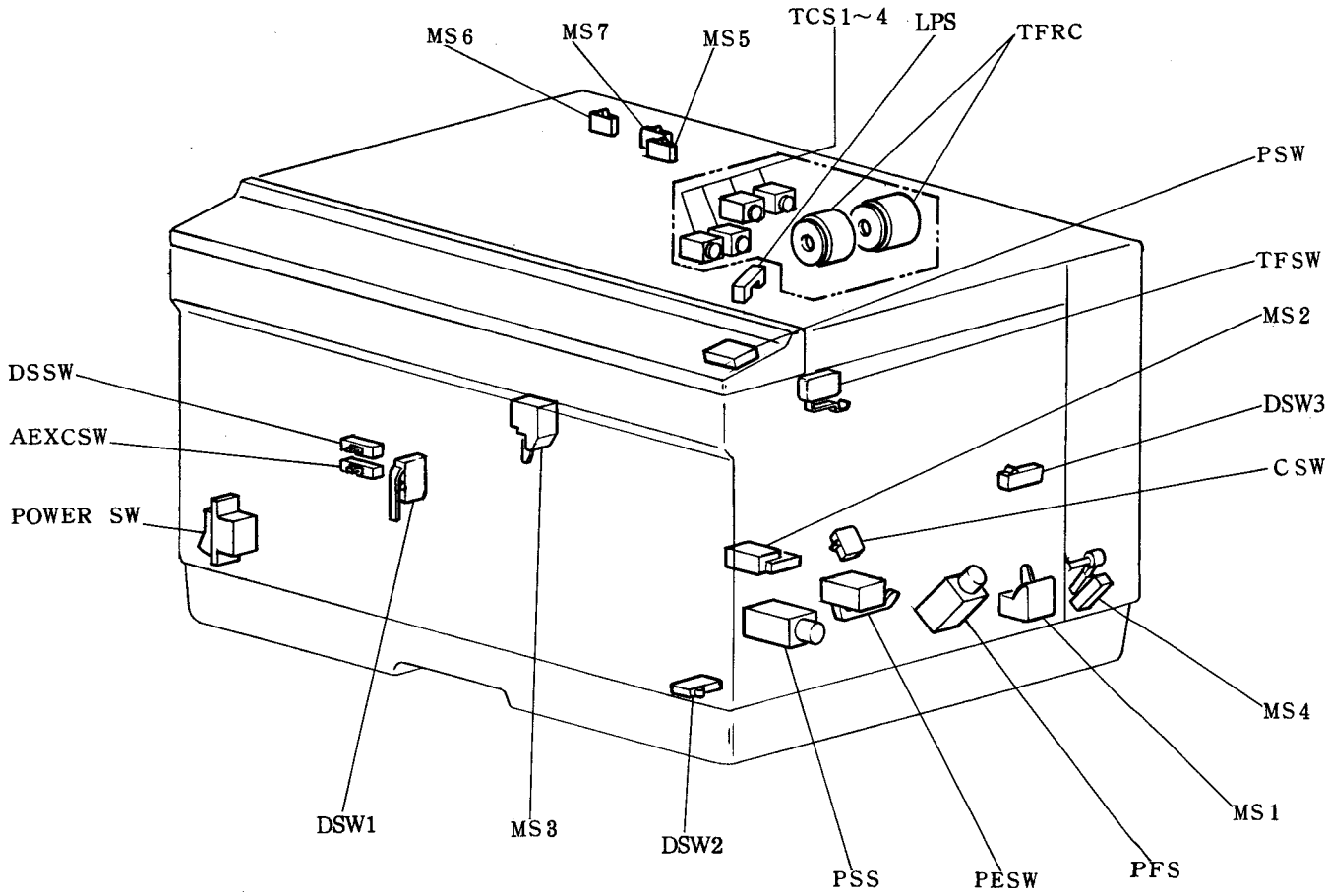

| | | | | | |
|---|---|---|---|---|---|
| ① | Cooling fan | ② | Cooling fan motor- | ③ | Clam sheel lever |
| ④ | Clam shell latch | ⑤ | Power switch | ⑥ | Power transformer |
| ⑦ | Paper delivery roller | ⑧ | Discharge brush | ⑨ | Fuse |
| ⑩ | Power relay | ⑪ | Paper exit guide | | |

## 7. Original Table Side




| | | | | | |
|---|---|---|---|---|---|
| ① | Table glass | ② | Operational panel | ③ | Clip tray |
| ④ | MS6 actuator adjusting screw | | | | |
| | | | | | |

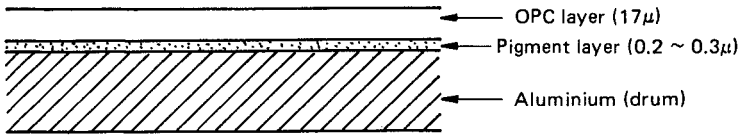
## 8. Switch Location and Function



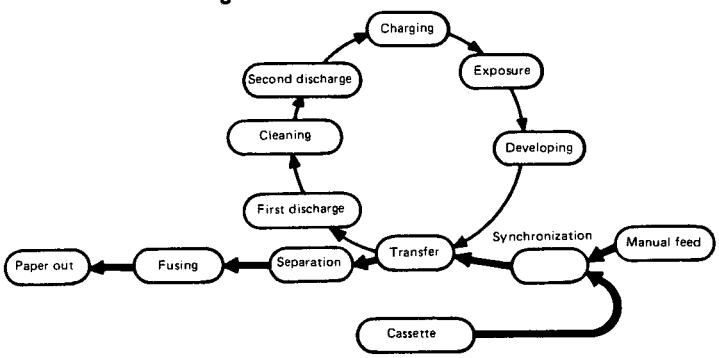

| Switch name | Type | Function |
|---|---|---|
| MS1 | Reed switch | Paper entry sensor |
| MS2 | Reed switch | Paper separation sensor |
| MS3 | Reed switch | Paper exit sensor |
| MS4 | Reed switch | Manual paper feed sensor |
| MS5 | Microswitch | Table home position sensor |
| MS6 | Reed switch | Table home position and PSS actuating timing sensor |
| MS7 | Reed switch | Table overrun sensor |
| DSW1 | Microswitch | Front cover positon sensor |
| DSW2 | Microswitch | Paper entry side U-turn guide open/close sensor |
| DSW3 | Microswitch | DV guide setup sensor |
| CSW | Microswitch | Cassette sensor |
| PESW | Reed switch | Cassette paper empty sensor |
| TFSW | Microswitch | Full toner collection container sensor |
| LPS | Photosensor | Lens position sensor |
| PSW | Pushbutton switch | Print switch |
| AEXCSW | Slide switch | Automatic exposure correction switch |
| DSSW | Slide switch | drum sensitivity select switch |
| POWER SW | See-saw switch | Power switch |
| PES | Solenoid | Paper feed solenoid |
| PSS | Solenoid | Paper stop solenoid |
| TSC1 ~ 4 | Solenoid | Table speed select solenoid |
| TFRC | Magnetic clutch | Table feed, return clutch |

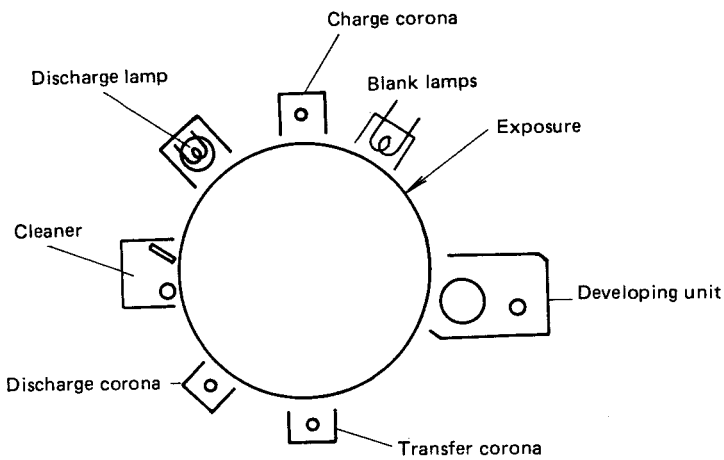
# [5] SF-7200 Copy process

- The OPC (Organic PhotoConductor) is used for the photoconductor of the SF-7200.




## 1. Functional Diagram

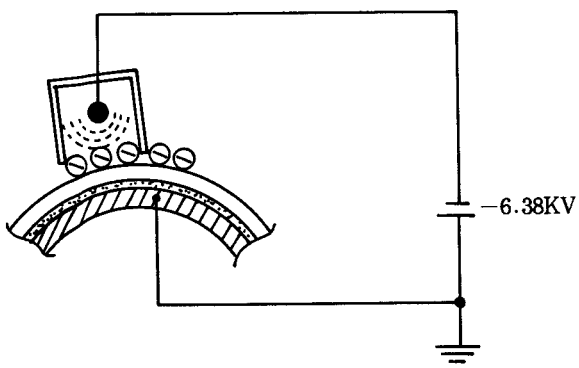



## 2. SF-7200 Basic Copy Process

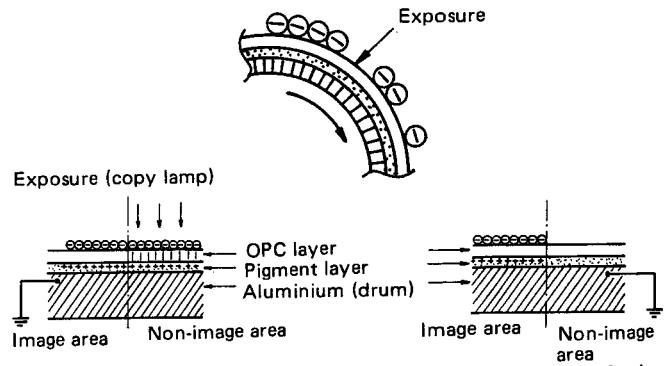
STEP 1. DC charge (–6.38KV DC, 580μA)

Uniform negative charge is applied over the OPC drum surface by the main corona.




STEP 2. Exposure (copy lamp, mirrors, and lens)

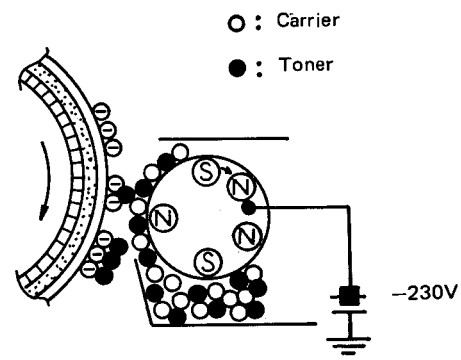
Light from the copy lamp, reflected from the original is projected onto the drum surface through the mirrors and lens. The resistance of the OPC layer decreases for an area exposed by the light (corresponding to the light area of the original). The light neutralizes the negative charge. The dark areas of the original do not reflect the light and form an electrostatic latent image.




In the reduction mode, the area outside of the original area is neutralized by the BL (blank lamp) prior to exposing.

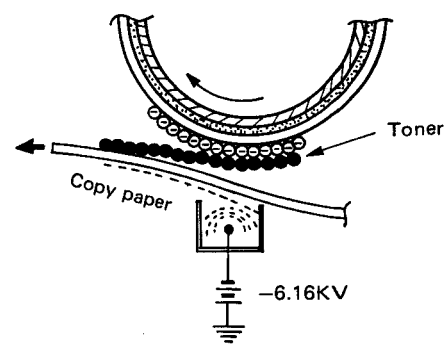
STEP 3. Developing (–230V bias)

The electrostatic latent image is converted into a visible image by the toner. A bias potential of –230V is applied to the carrier (MG roller) in the two component magnetic brush developing method, and the toner is charged positive through friction with the carrier.



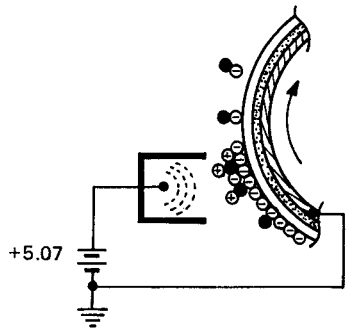

STEP 4. Transfer (–6.16KV DC, 280μA)

The visible image on the drum surface is transferred onto the copy paper by applying a negative charge from the transfer corona to the back of the copy paper. (Transfer efficiency is 70 to 80%.)



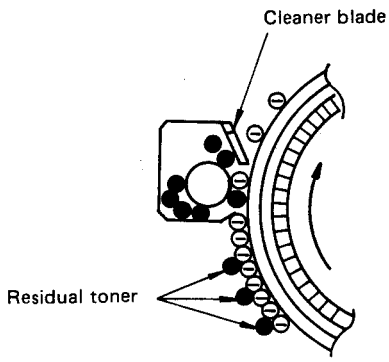
STEP 5. Discharge Corona (+5.07KV DC, 118μA)

The negative charge on the drum surface is removed by the positive potential from the discharge corona. The attraction power of the toner on the drum surface becomes weaker.



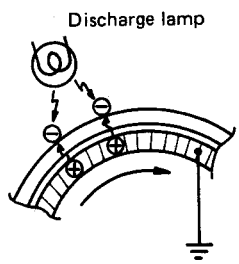

STEP 6. Cleaning

Toner remaining on the drum is collected by the cleaner blade and deposited in the toner collecting container.

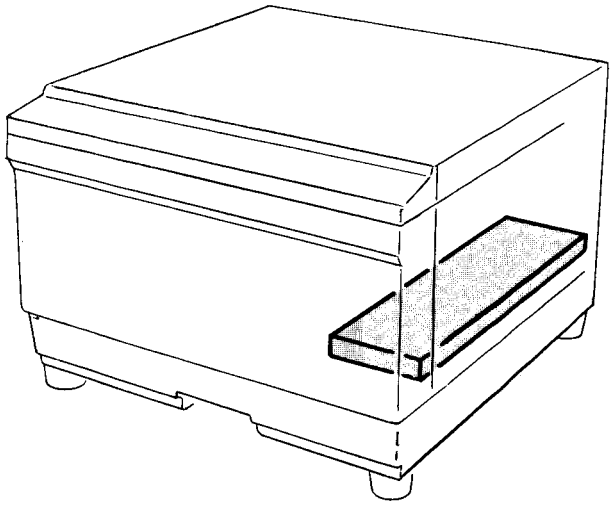



STEP 7. Discharge Lamp

Light from the discharge lamp exposes the drum surface to reduce the electrical resistance in the OPC layer. This removes the residual surface charge.



# [6] Paper feed unit



## 1. Features of the Paper Feed Unit

Copy paper is supplied automatically from the universal 250-sheet cassette or manually from the manual feed table. 250-sheet cassette can be mounted on the machine through the slit under the front cover of the machine. The manual feed table can be used for copying of a special paper and single sheet two sided copy.

(Types of papers applicable for cassette feeding)

Paper size: 10" x 14" to 8½" x 5½" (B4 to A5)

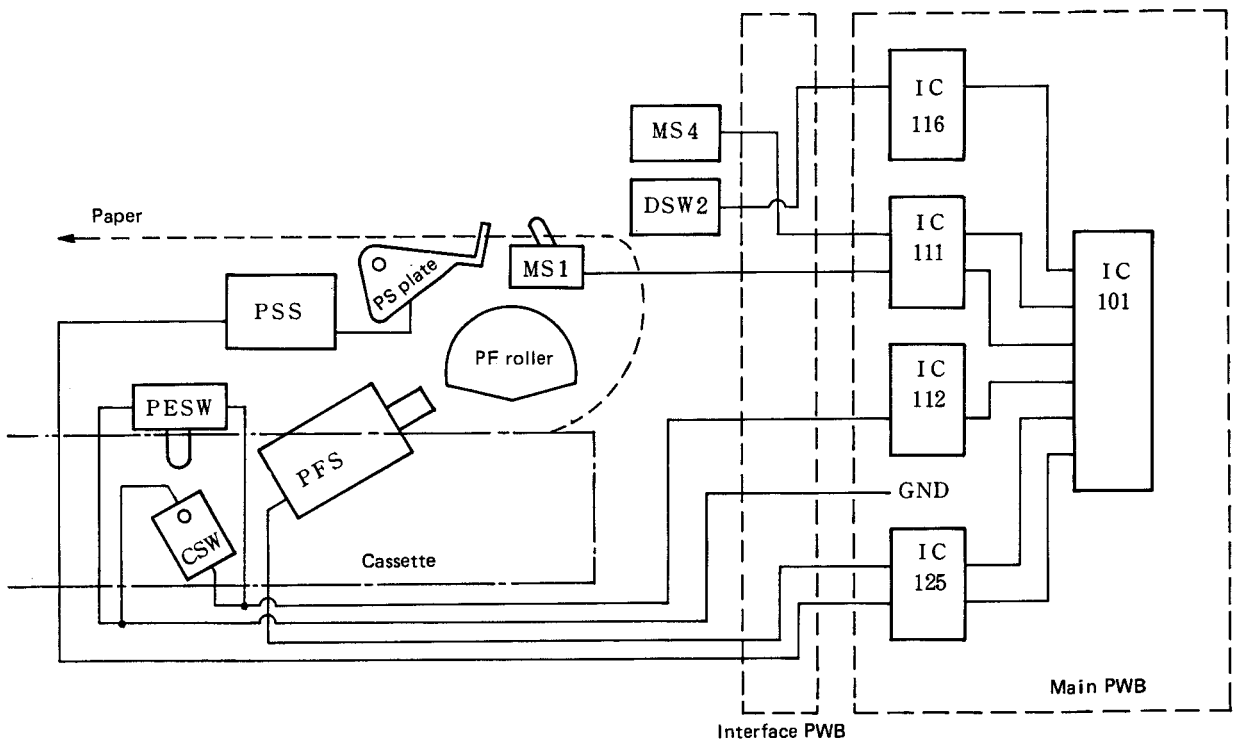
Paper weight: 14.9 lbs to 21.3 lbs (56g/sq.m to 80g/sq.m)

(Types of papers applicable for manual feeding)

Paper size: 10" x 14" to 8½" x 5½" (B4 to A6)

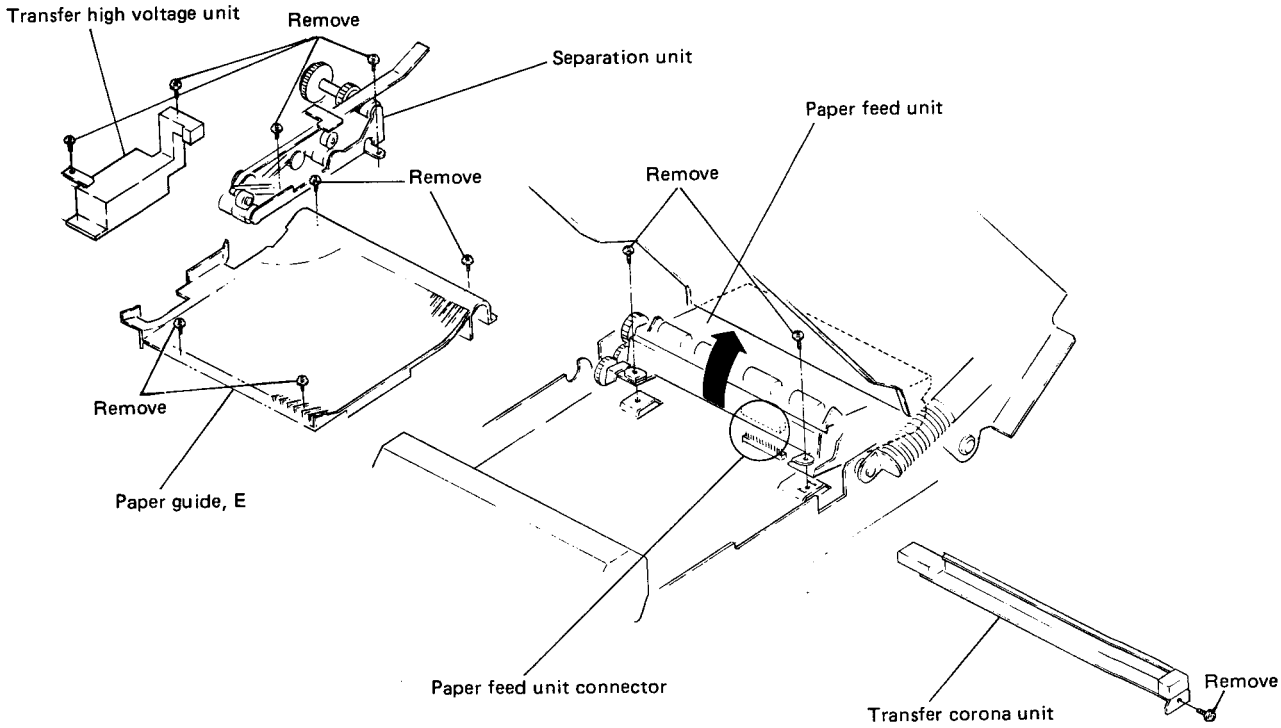
Paper weight: 12.0 lbs to 29.3 lbs (52g/sq.m to 128g/sq.m). However, paper exceeding 24.0 lbs (105g/sq.m) is limited below 8½" x 11" (A4).

Block diagram

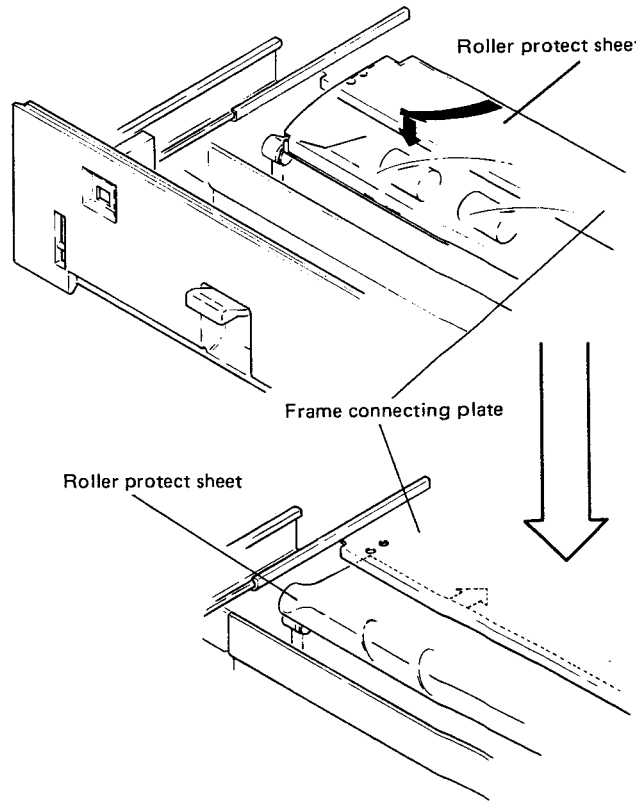


## 2. Removing the Paper Feed Unit

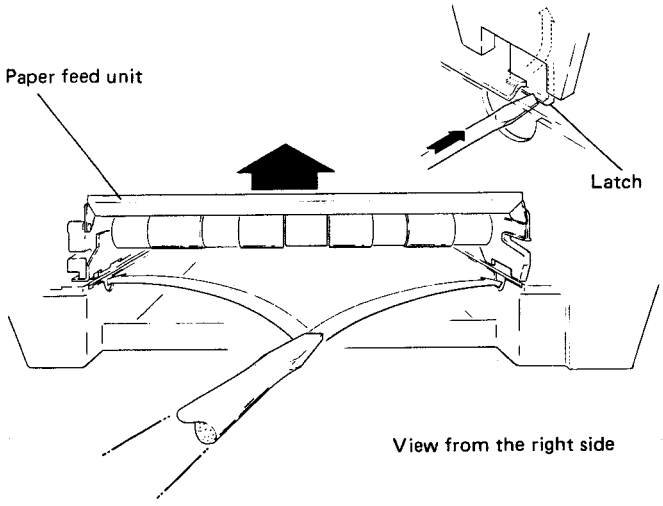
① Remove the DV unit, then remove the drum unit.
② Remove the transfer corona unit.
③ Remove the paper guide E.
④ Remove the separation unit.
⑤ Remove the transfer high voltage unit and it's connector.
⑥ Remove two screws that secure the paper feed unit. Lift it up in the arrow direction, and unfasten the paper feed unit connector.




⑦ Unlock two paper feed unit latches, locked in the square holes in the paper feed side bottom frame with a screwdriver.
⑧ Insert the roller protect sheet, attached to the paper feed, unit under the frame connecting plate.



⑨ Lift up the paper feed unit and remove it from the paper exit side of the copier.

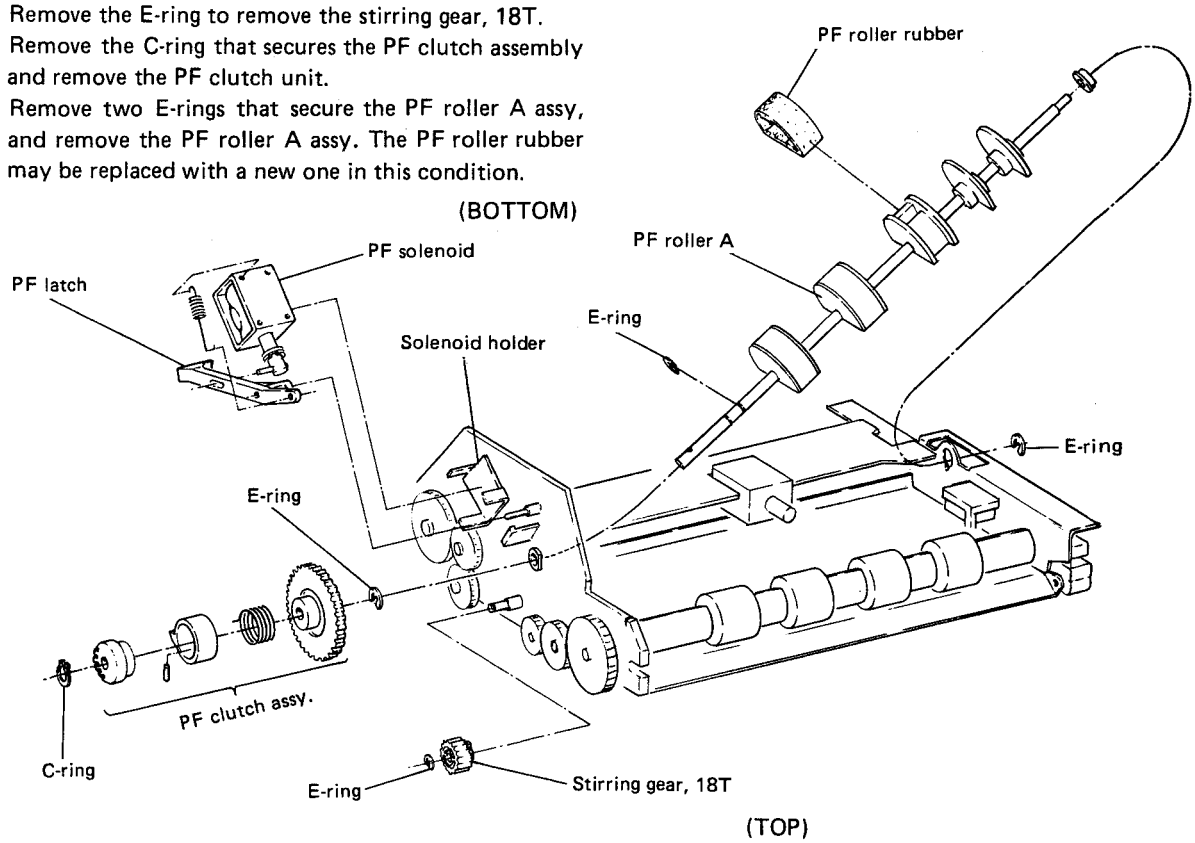



## 3. Removing the Paper Feed Unit Major Components

The paper unit must be removed from the copier prior to this job.

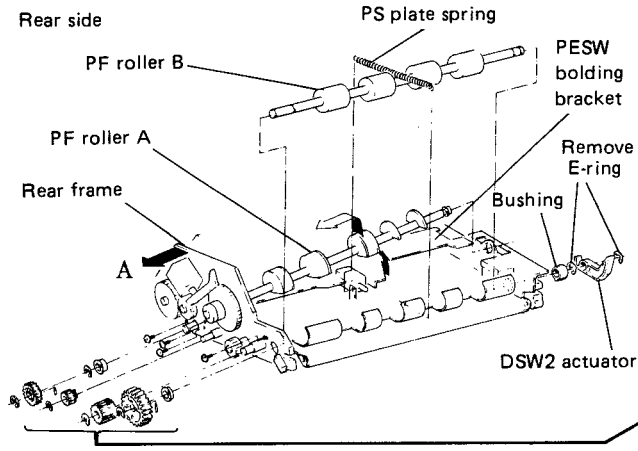
### (1) PF roller A assy

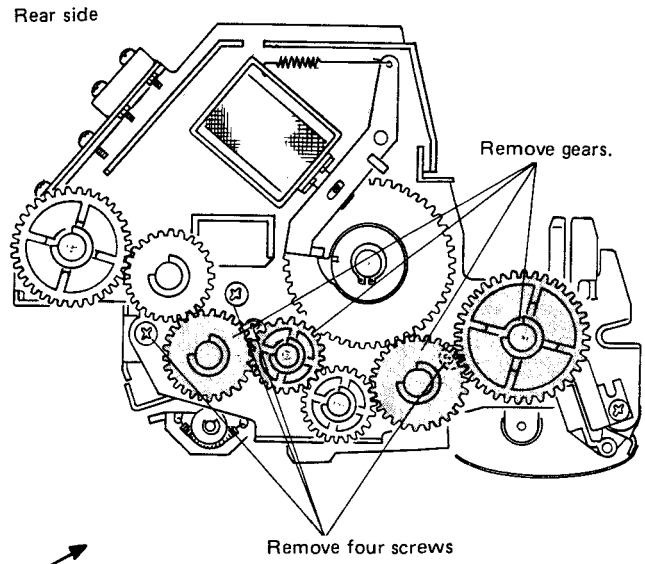
① Remove the PF solenoid and unlock the PF latch. The PF solenoid is secured to the solenoid holder with latches at three locations.
② Remove the E-ring to remove the stirring gear, 18T.
③ Remove the C-ring that secures the PF clutch assembly and remove the PF clutch unit.
④ Remove two E-rings that secure the PF roller A assy, and remove the PF roller A assy. The PF roller rubber may be replaced with a new one in this condition.



### (2) PF roller B

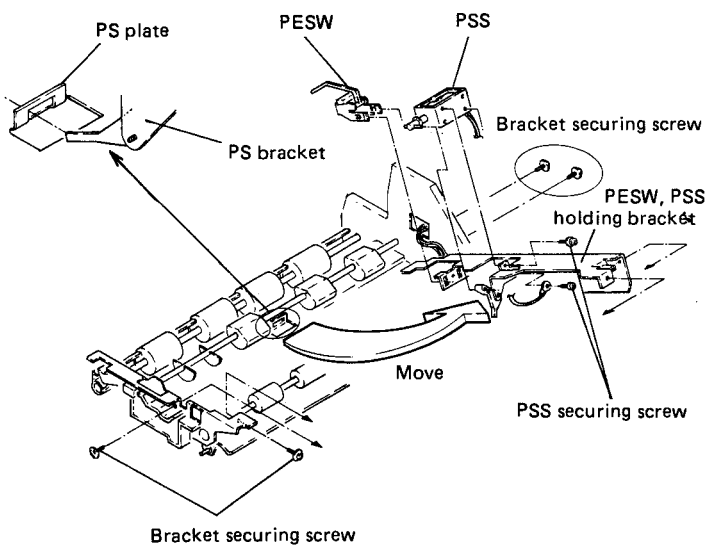
① Remove the PS plate spring.
② Remove the 2 E-rings on the front frame side of the paper feed unit, DSW2 actuator, and bushing.
③ Remove the screws that secure the gear and frame on the rear frame side of the paper feed unit in reference to the detailed view, and remove the frame in the arrow direction "A" along the frame, with care that the PF roller A should not make contact with the PESW holding bracket.
④ Remove the PF roller B in this condition.

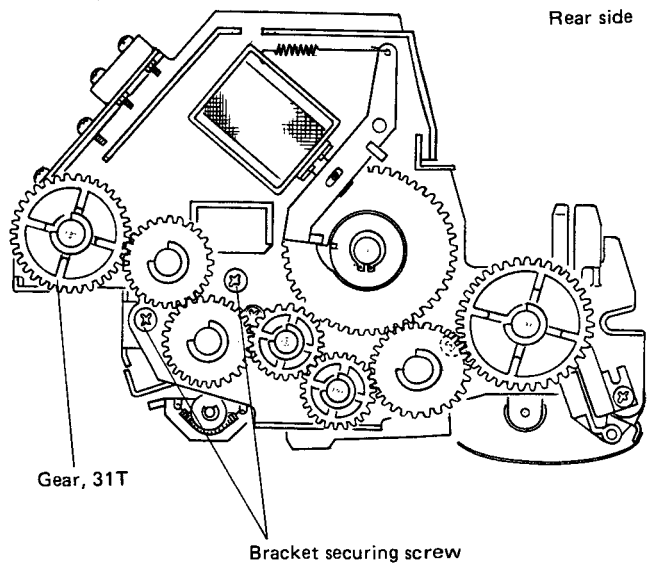



### (3) PESW, PSS

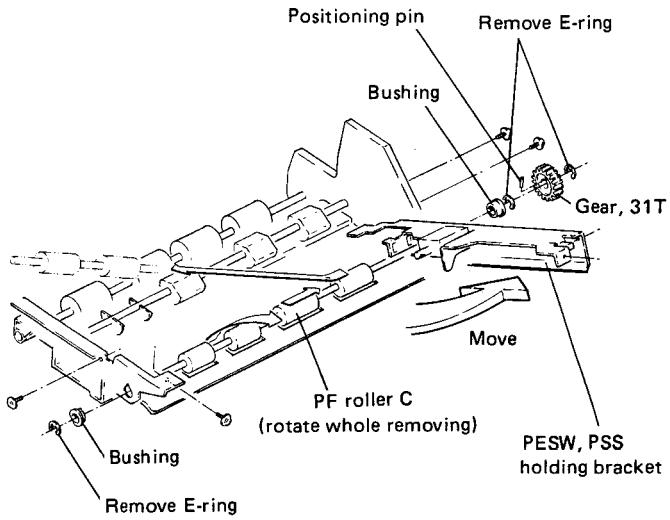
① Remove four screws that hold the PESW and PSS holding bracket and move the lower side bracket to the position shown in the figure. Pay attention when moving the bracket to the area where the PS bracket makes contact with the PS plate.
② Remove the PESW locking pawl and remove the PESW.
③ Remove two PSS securing screws and remove the PSS.



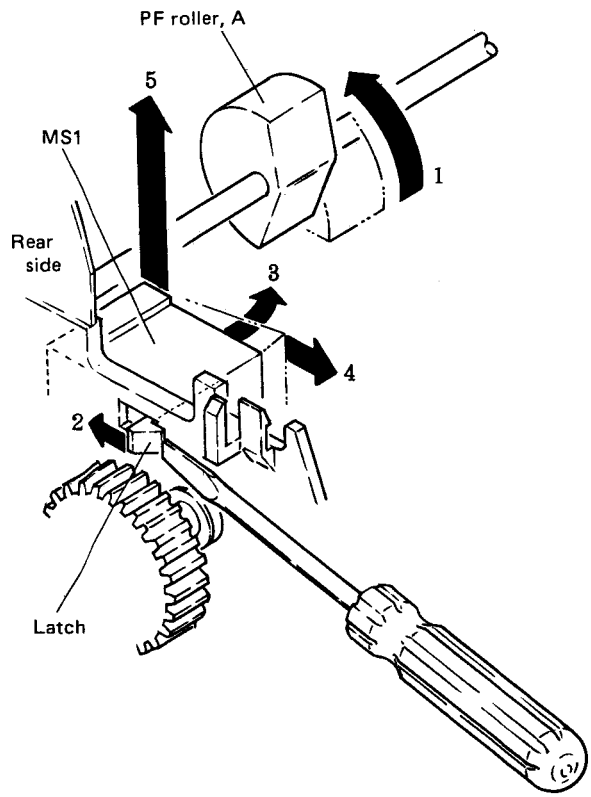
### (4) PF roller C

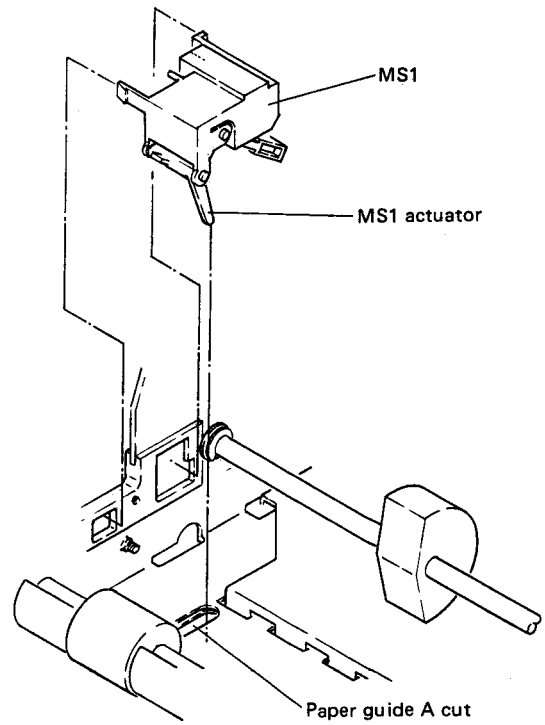
① Remove the PF roller C holding E-ring, gear 31T, and the bushing.
② Rotate the roller as the roller of the PF roller C hits against the cut (see the figure).




### (5) MS1

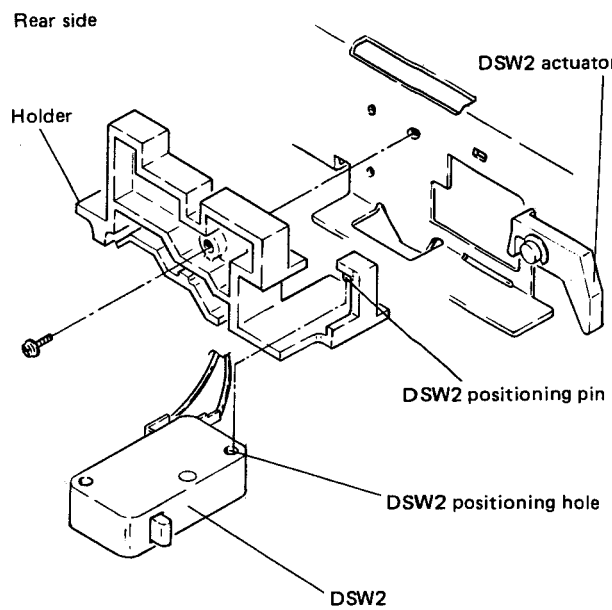
① Rotate the PF roller A and bring it to the location shown in the figure.
② Push the MS1 latch with the tip of a screwdriver to remove.
③ Move the MS1 in order of arrowheads, 3, 4, and 5, and remove. (Take care in removing it as the MS1 actuator is engaged to the cut in the paper guide A.)




### (6) DSW2

① Remove the switch holder.
② Remove the positioning pin and remove the DSW2.



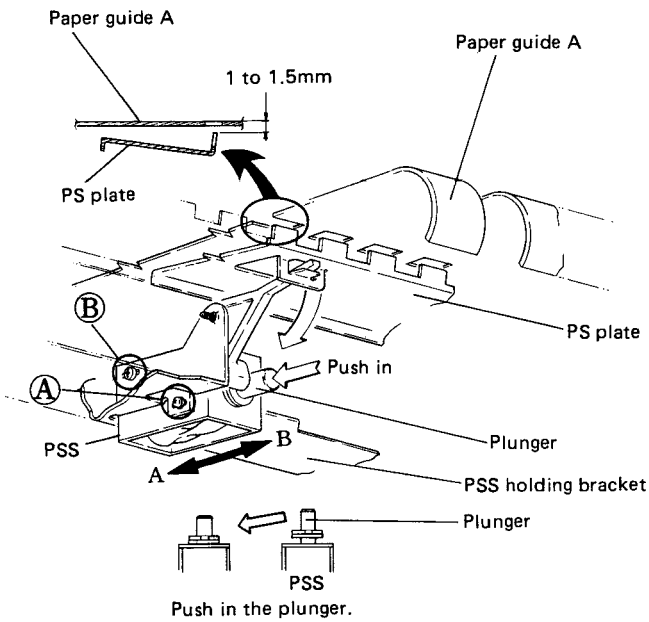
## 4. Adjustments

### (1) PSS position adjustment

Push the plunger all the way in the arrow direction. Adjust the position of the PSS so that the top end of the PS plate comes to 1 to 1.5mm below the top of the paper guide A.

① Loosen two screws that secure the PSS.

② While pushing the plunger in, move the PSS so that the top end of the PS plate comes to 1 to 1.5mm from the top of the paper guide A, then fasten the PSS with the screw Ⓐ. Moving the PSS in the arrow direction A makes the PS plate lower. Moving it in the arrow direction B, makes the PS plate rise.



Push in the plunger.

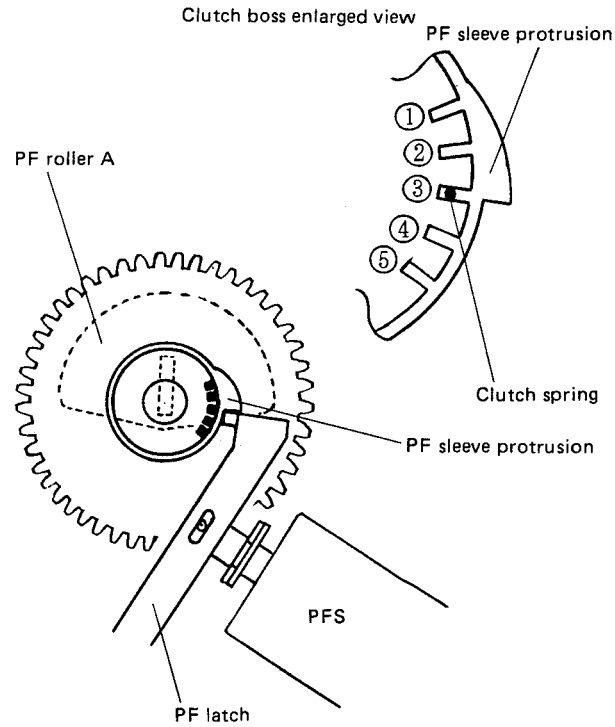
### (2) PF roller A position adjustment

Change the installation location of the PF clutch spring to the clutch boss so that the PS roller A is held horizontal (level). As it has five positions, the clutch spring has been factory set to the position ③.

① Remove the C-ring that secures the PF clutch.

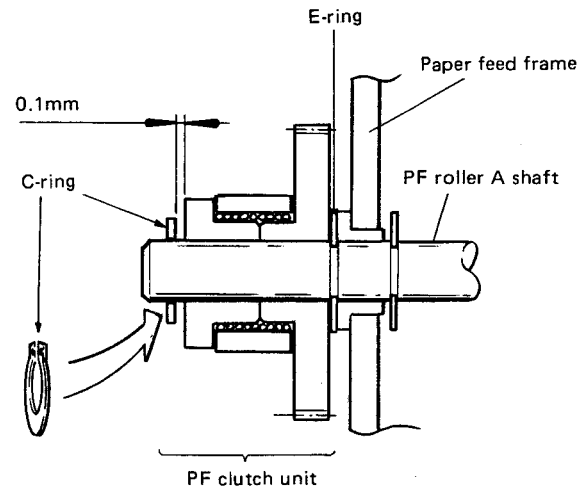
② Engage the PF latch to the protrusion of the PF sleeve.

③ If the PF roller A is not installed horizontal (level), change the position of the clutch spring to the clutch boss.

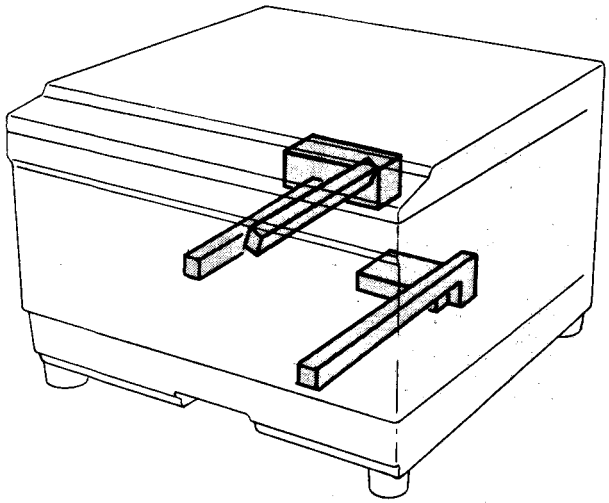


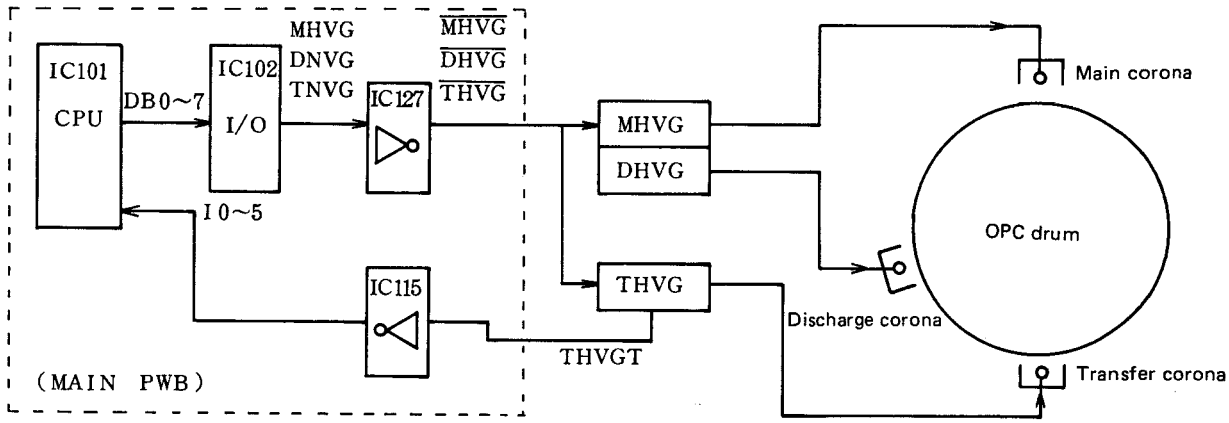

### (3) PF clutch unit installation

① Press the clutch unit E-ring all the way in, and secure it with the C-ring, within a clearance of 0.1mm between the C-ring and the clutch unit.



# [7] High voltage unit






## 1. General Description

There are three types of corona units used in the SF-7200; the main, transfer, and separation corona units.

The main corona applies a uniform negative charge to the drum surface. The transfer corona is used to transfer the toner from the drum onto the copy paper. The discharge corona reduces the negative charge on the drum to allow easier toner removal at the cleaner unit.

A fault sensing circuit has been incorporated in the transfer high voltage unit to prevent developer pull. Copier operation is stopped by the activation of the status code function "C2", if the machine experiences a loss of transfer high voltage.

For example: When the corona wire is broken or when the corona is not properly inserted.

## 2. High Voltage Units

### (1) Main high voltage unit (MHVG)

output=–6.38KVDC, 580μA

(DCD sheet current: –32±3μA, with tolerance of 2μA between the front and the rear)

### (2) Transfer high voltage unit (THVG)

output=–6.16KVDC, 280μA

(DCD sheet current: –20±3μA, with tolerance of 2μA between the front and the rear)

### (3) Discharge high voltage unit (DHVG)

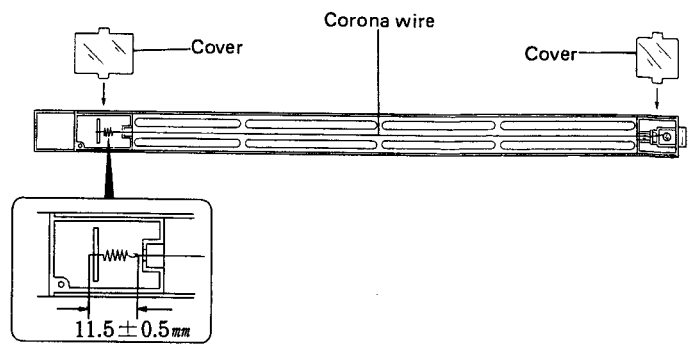
output=+5.07KVDC, 118μA

(DCD sheet current: +4.0±1μA, with tolerance of 1μA between the front and the rear)

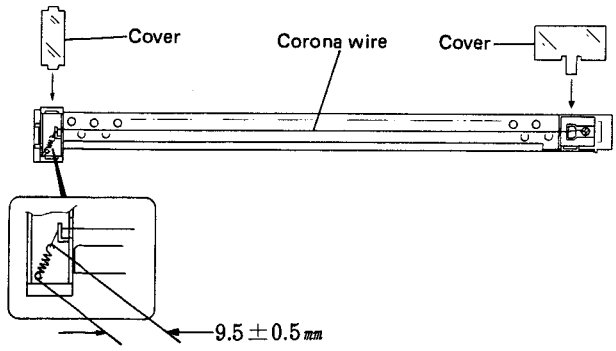
## 3. Corona Wire Replacement

Refer to the figure below for replacement of the corona wire.

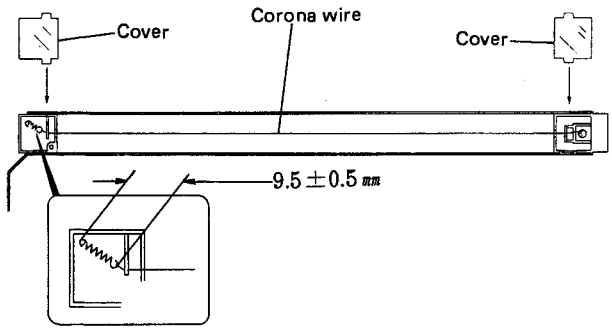
### (1) Main corona wire



### (2) Transfer corona unit

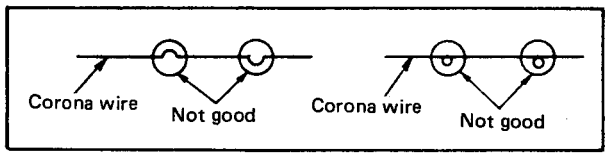



### (3) Discharge corona unit




(Precautions when replacing the corona wires)

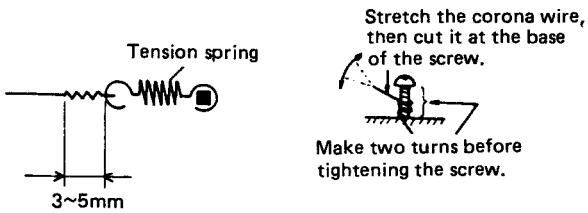
① The corona wire must not be twisted or kinked




② Clean the corona wire after replacement with alcohol only.

③ Wipe dry after cleaning.

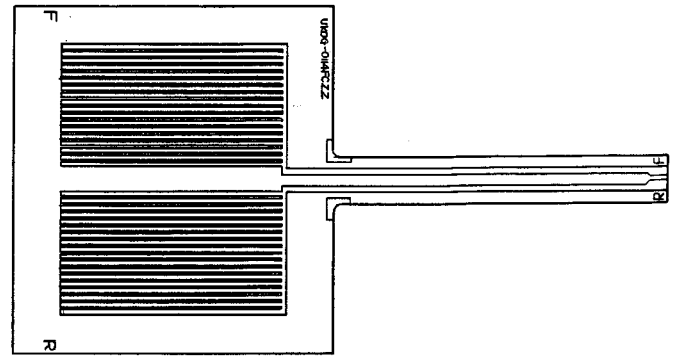
④ Use the 70 micron corona wire (DWIR-0466CSZZ).


Tension spring
3~5mm
Stretch the corona wire, then cut it at the base of the screw.
Make two turns before tightening the screw.

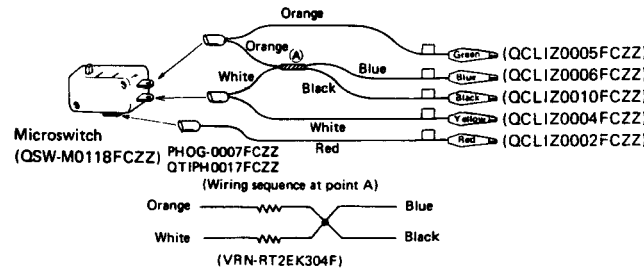
## 4. High Voltage Unit Output Adjustments (DCD).

### (1) Tools required:

① DCD test sheet (UKOG-0114FCZZ)

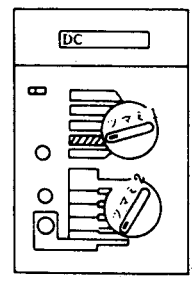


② DCD test sheet harness (DHAI-0304FCZZ).




③ Digital multimeter (or micro-ammeter).

NOTE: The meter must have a measuring range of 0 to 100μA, with a tolerance of ±1%.




Digital multimeter

(UKOGE0119FCZZ)

### (2) The high voltage unit must be adjusted for any of the following reasons:

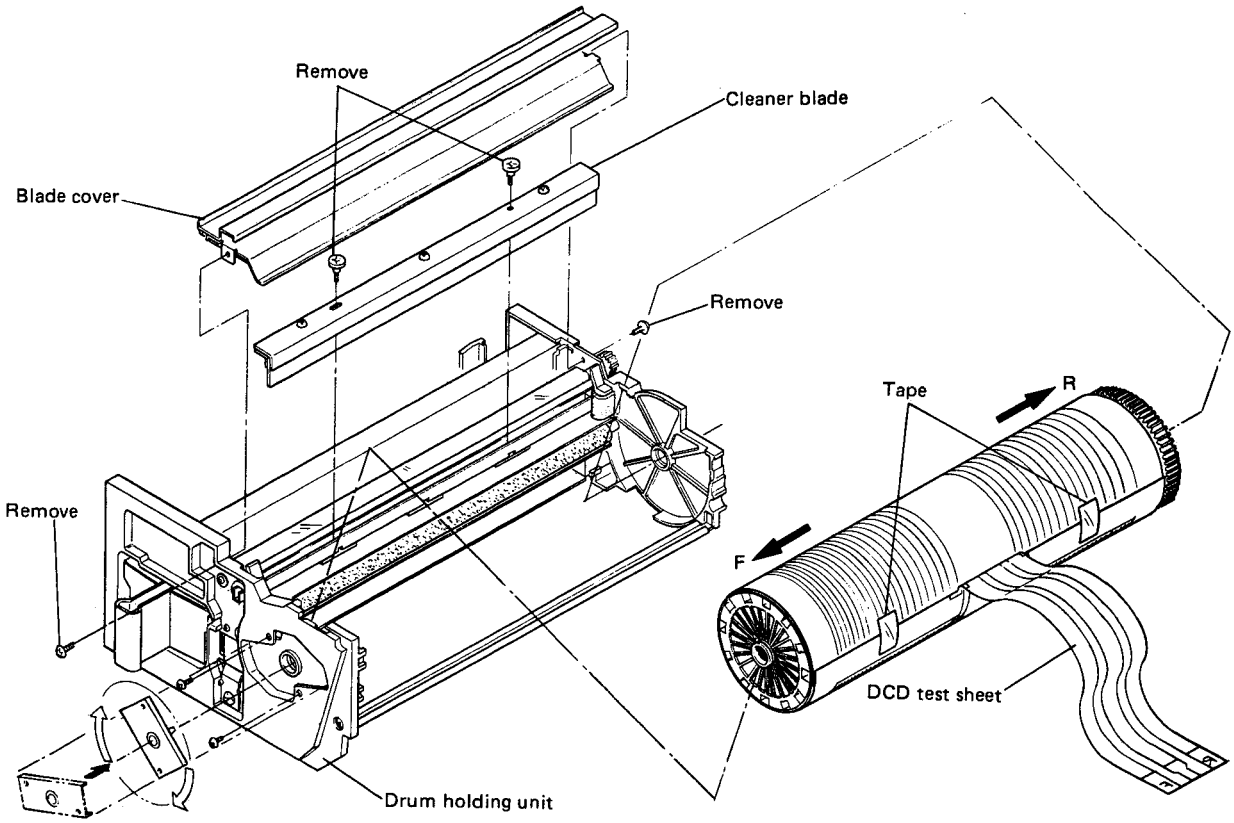
① After replacement of the main or transfer high voltage unit.

② After replacement of the main or transfer corona unit.

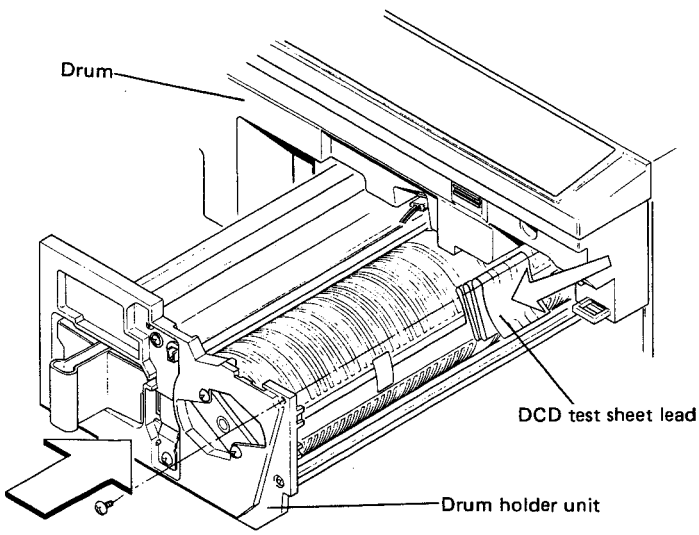
### (3) Corona output adjustment procedures;

a. Main corona current adjustment

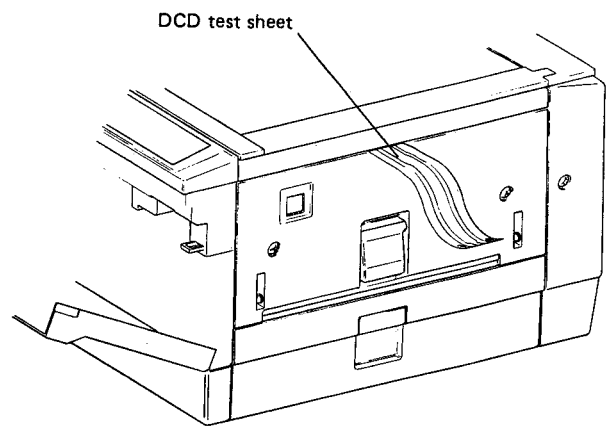
① Remove the drum holder unit, developing unit, main corona unit, and the transfer/separation corona unit.
② Remove the drum cleaner blade from the drum holder unit.
③ Install the DCD test sheet on the drum. Attach with rubber bands.
④ Replace the drum back in the drum unit holder.




⑤ Replace the drum unit holder back in the copier.




⑥ Route the DCD test leads through the developing unit cavity.

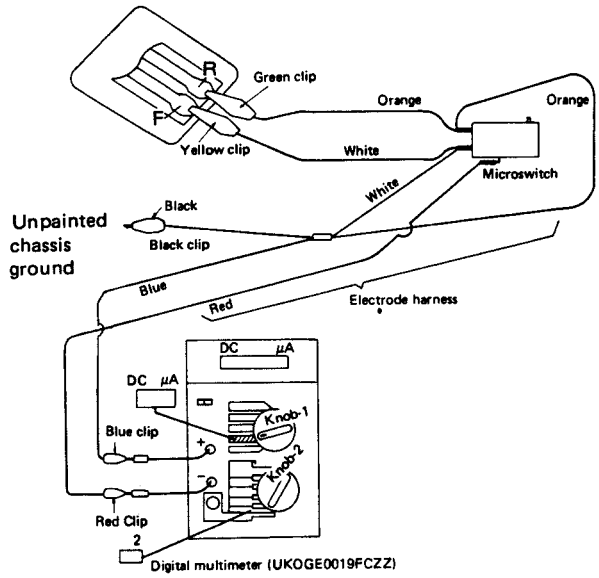


⑦ Clean the main corona wire, and replace the main corona unit back in the machine. Do not set the transfer and discharge corona units and the developing unit back in the machine.

⑧ Close frames.

⑨ Close front cabinet.

⑩ Connect the DCD test leads to the digital multimeter (or ammeter) and the DCD test sheet.




IMPORTANT:

Make sure that the black test lead is connected to a good chassis ground.

When the digital multimeter is used, connect the test leads as follows:

Red clip to the negative jack of the meter.

Blue clip to the positive jack of the meter.

And set the meter range as follows:

Knob-1 to DCmA range.

Knob-2 to 0.2.

When the ammeter is used, connect the test leads as follows:

Red clip to the negative jack of the ammeter.

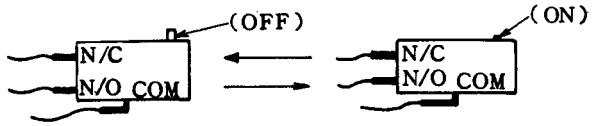
Blue clip to the positive jack of the ammeter.

⑪ Measure the current at the front and rear frame sides. The current difference must be within 2.0μA.

a. Enter the test command 09. The main high voltage unit will activate for 30 seconds.

b. Measure the drum current at the front and rear frame sides.

- When the test harness microswitch is off, the front frame side current is indicated on the meter.
- When the test harness microswitch is on, the rear frame side drum current is indicated on the meter.




NOTE: There may be slight fluctuations in the meter reading during this measurement. The average value is used as the measured value.

- If the current difference is greater than 2.0μA, replace the corona unit.

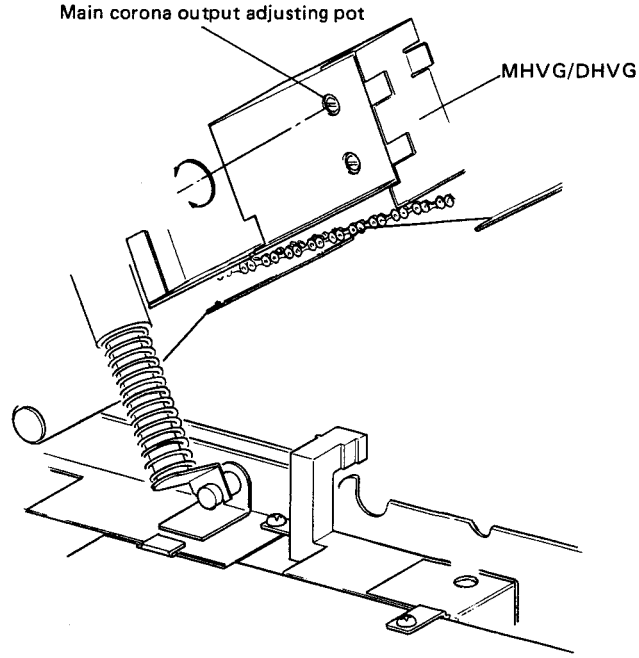
⑫ Main corona output adjustments.

a. Enter the test command 09. The main high voltage unit will activate for 30 seconds.

b. Measure the output current.

The output current for the main corona should be: 32.0±2.0μA.

Adjust the pot on the rear frame side if necessary.




b. Transfer corona current adjustment.

① Observe the procedures (3)-a-①through⑥. (DCD sheet installation)

② Clean the transfer corona wire, and replace the transfer corona unit back in the machine. Do not set the main and discharge corona units and the developing unit back in the machine.

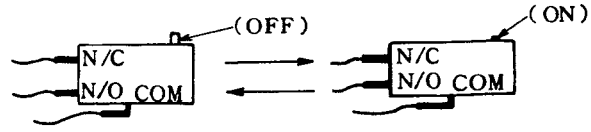
③ Observe the procedures (3)-a-⑧through ⑩. (meter set up)

④ Measure the current at the front and rear frame sides. The current difference must be within 2.0μA.

a. Enter the test command 10. The transfer high voltage unit will activate for 30 seconds.

b. Measure the drum current at the front and rear frame sides.

- When the test harness microswitch is off, the front frame side current is indicated on the meter.
- When the test harness microswitch is on, the rear frame side drum current is indicated on the meter.



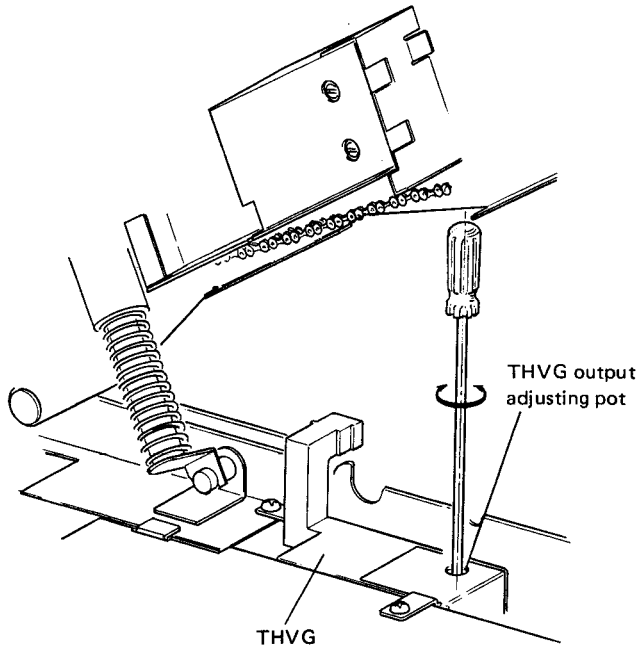

- If the current difference is greater than 2.0μA, replace the corona unit.

NOTE: There may be slight fluctuations in the meter reading during this measurement. The average value is used as the measured value.

⑤ Transfer corona output adjustments.

a. Enter the test command 10. The transfer high voltage unit will activate for 30 seconds.

b. Measure the output current.
The output current for the transfer corona should be: 20.0±2.0μA.
Adjust the pot on the rear frame side if necessary.



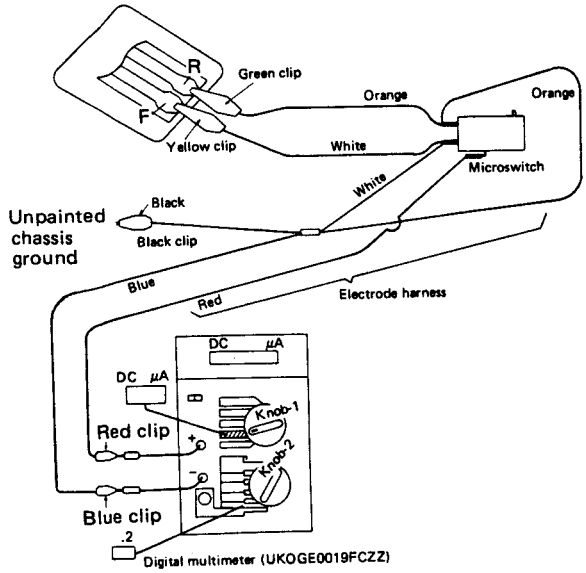

c. Discharge corona current adjustment

① Observe the procedures (3)-a-①through⑥. (DCD sheet installation)

② Clean the discharge corona wire, and replace the discharge corona unit back in the machine. Do not set the main and transfer corona units and the developing unit back in the machine.

③ Close frames.

④ Connect the DCD test leads to the digital multimeter (or ammeter) and the DCD test sheet.




IMPORTANT:

Make sure that the black test lead is connected to a good chassis ground.

When the digital multimeter is used, connect the test leads as follows:

Blue clip to the negative jack of the meter.

Red clip to the positive jack of the meter.

And set the meter range as follows:

Knob-1 to DCmA range.

Knob-2 to 0.2.

When the ammeter is used, connect the test leads as follows:

Blue clip to the negative jack of the ammeter.

Red clip to the positive jack of the ammeter.

IMPORTANT:

Make sure that the black test lead is connected to a good chassis ground.

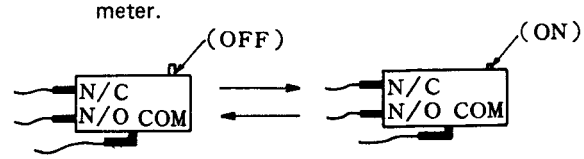
There may be slight fluctuations in the meter reading during this measurement. The average value is used as the measured value.

⑤ Measure the drum current at the front and rear frame sides.

The output current for the discharge corona should be: 4.0±1.0μA.

a. Enter the test command 11. The discharge will activate for 30 seconds.

- When the test harness microswitch is off, the front frame side current is indicated on the meter.
- When the test harness microswitch is on, the rear frame side drum current is indicated on the meter.

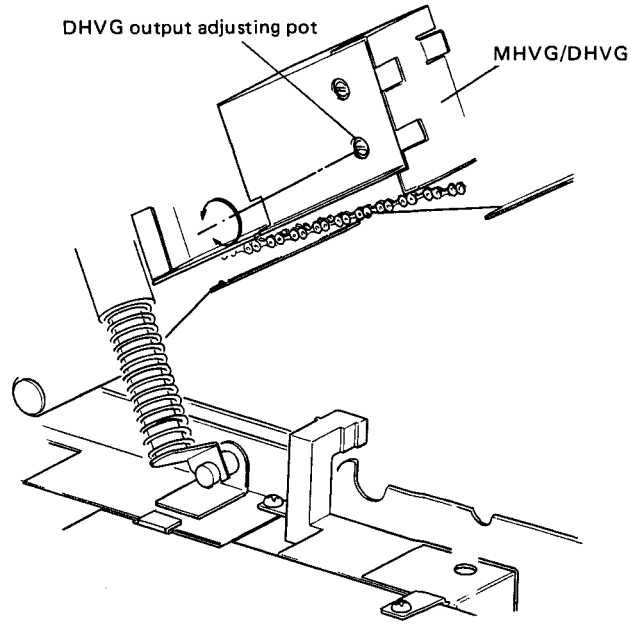



- If the current difference is greater than 1.0μA, replace the corona unit.

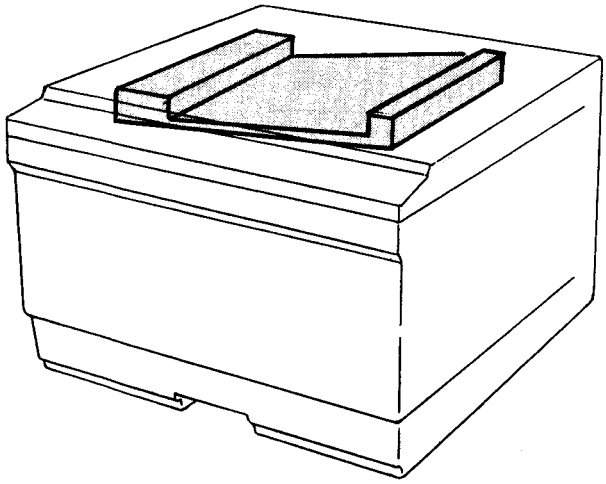
⑥ Discharge corona output adjustments.

a. Enter the test command 11. The discharge high voltage unit will activate for 30 seconds.

b. Measure the output current.
The output current for the discharge corona should be: 4.0±1.0μA.
Adjust the pot on the rear frame side if necessary.



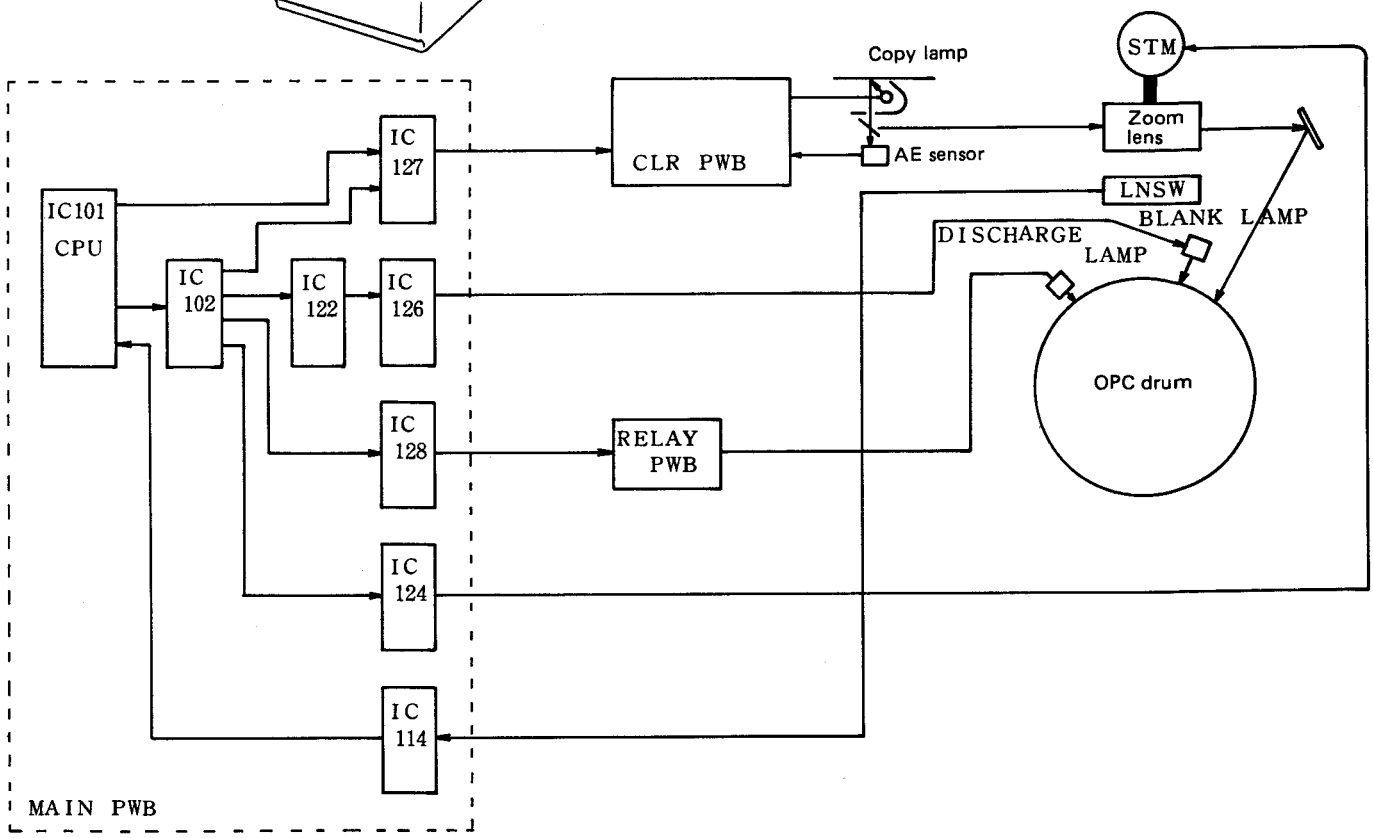
# [8] Optical system

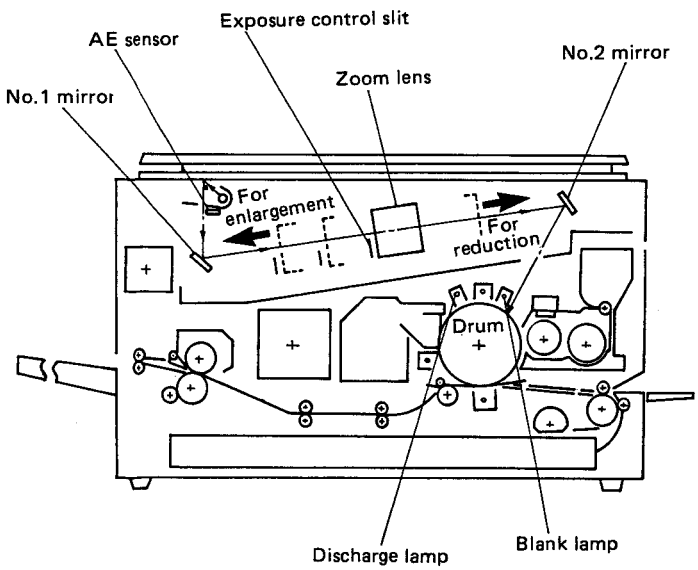


## 1. General Description

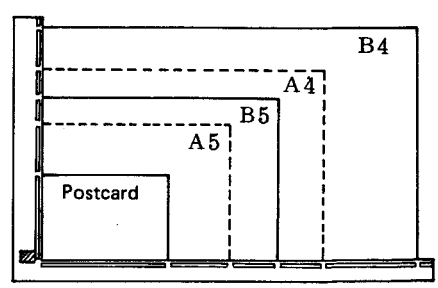
A zoom lens is used for the SF-7200, and exposure is controlled by electronically varying the intensity of the copy lamp. The voltage applied to the copy lamp is stabilized to enhances uniform exposure.

A slit exposure and stationary light source is used in combination with a moving original table. Because the internal zoom lens position is shifted relative to the mirrors, reduction and enlargement is achieved without affecting the distance between the original and the drum. The mirror position and angle does not change as in conventional optical systems. The lens is positioned by means of a stepping motor.



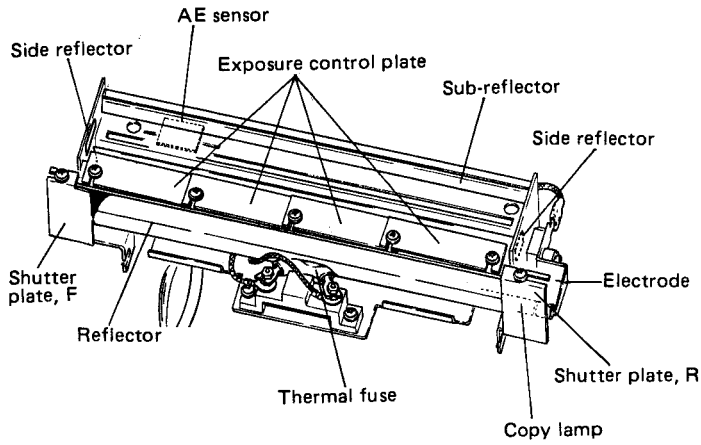




The original table is movable and the original aligned to the reference line at the front left of the original glass.

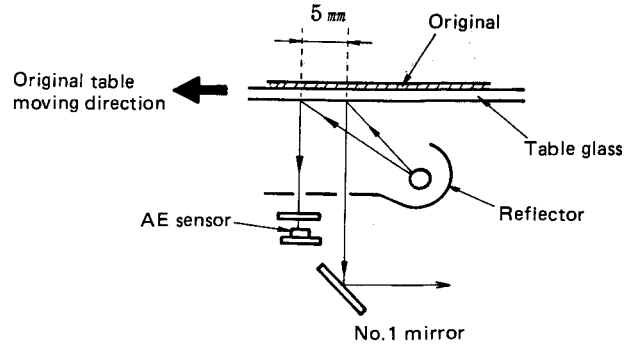


## 2. Major Parts Identification and Function

### (1) Copy lamp

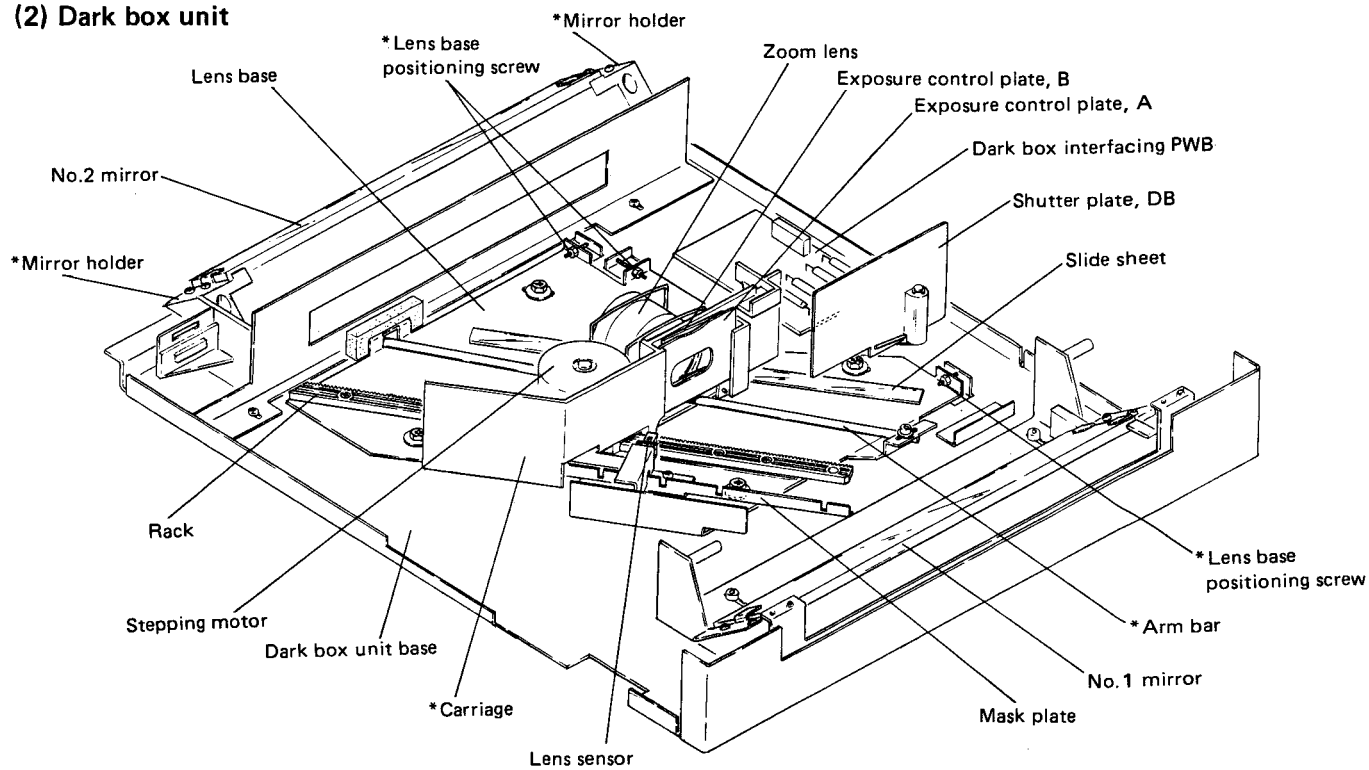



- AE sensor
  Intensity of original image is sensed by the light from the copy lamp, and result is transferred to the CL Reg PWB for automatic exposure control.




- Copy lamp
  A 280W halogen lamp is used.
- Exposure control plates
  Exposure control plates are used to balance exposure by adjusting them along the oval hole.
- Thermal fuse
  A 150°C (100V series), (200V series 109°C) thermal fused is used to protect the optical system from an irregular temperature rise.

### (2) Dark box unit




NOTE: Do not remove and relocate the parts marked with as asterisk (*).

- Lens (zoom lens)
  The zoom lens is of the four-group type. Lens to lens distance varies according to magnification ratio to establish the required focal distance.
  The original to drum distance is fixed which eliminates the use of conventional mechanisms in which the focus is adjusted by moving the mirrors for a change of the original to drum distance. Replacement of individual lens is not permitted. It must be replaced by a lens base unit.

- Exposure control plates, A and B
  To maintain optimum light exposure on the drum in any magnification ratio, a portion of light is shut off between the lens and drum to vary the exposure rate according to the given magnification ratio. The exposure control plate moves according to the movement of the lens.
- Dark box interfacing PWB
  This PWB interfaces signals from the main PWB, stepping motor, and lens sensor.

- Shutter plate DB
  Unwanted light reflected from the No.1 mirror is shut off to prevent reflection inside the dark box unit.
- Arm bar
  As the lens position varies according to the magnification ratio, the lens to lens distance is varied to obtain the focus according to the given magnification ratio.
  The lens to lens distance is varied according to the position of the lens slide lever, and the movement of the lens slide lever is controlled by the inclination of the arm bar and the carriage movement.
  (Do not replace the single component of the arm bar, but replace it with a whole lens base unit.)
  The locations of the exposure control plates, A and B, change by the position of the arm bar inclination and carriage movement, in accordance with variation in the magnification ratio.
- Mask plate
  Used to detect the lens position. It has a slit cut at each magnification ratio.
- Lens sensor
  It is a photoelectric sensor used to sense the lens location.
- Carriage
  On the carriage is mounted the lens, stepping motor, and exposure control plates. Never try to replace the carriage by single components. It must be replaced by the lens base unit.
- Stepping motor
  The stepping motor is used to move the carriage according to the magnification ratio.

### (3) Blank lamp and void lamp

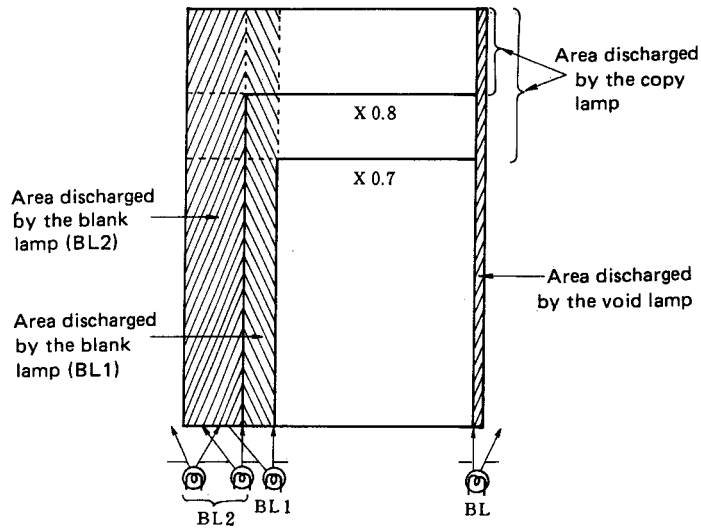
- Blank lamp and void lamp
  The blank lamp is integral with the void lamp. If a copy is made on paper that is larger than the reduced image in the reduce copy mode, it would make the unimaged portion (shadowed portion) black. Toner remains outside of the original image area in other copy modes because of the change remained on the drum. This residual toner is cleaned by applying light from the blank lamp to prevent a deposit of toner outside of the original image area. In addition, light from the void lamp is applied over the remover tape contact portion on the drum to prevent a deposit of the toner on the void area.

Blank lamp assignment

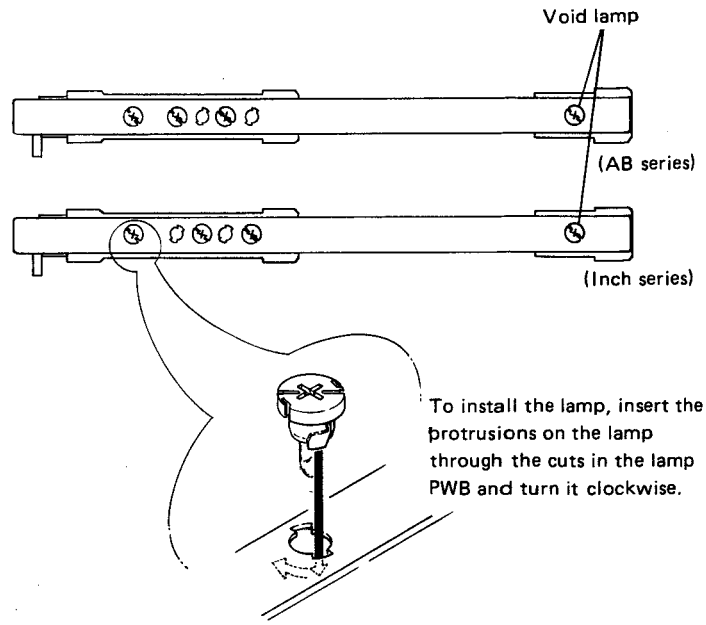
| Magnification ratio | BL1 | BL2 |
|---|---|---|
| x 0.8 | OFF | ON |
| x 0.7 | ON | ON |

NOTE: Two lamps are used for BL2.

Drum developed view



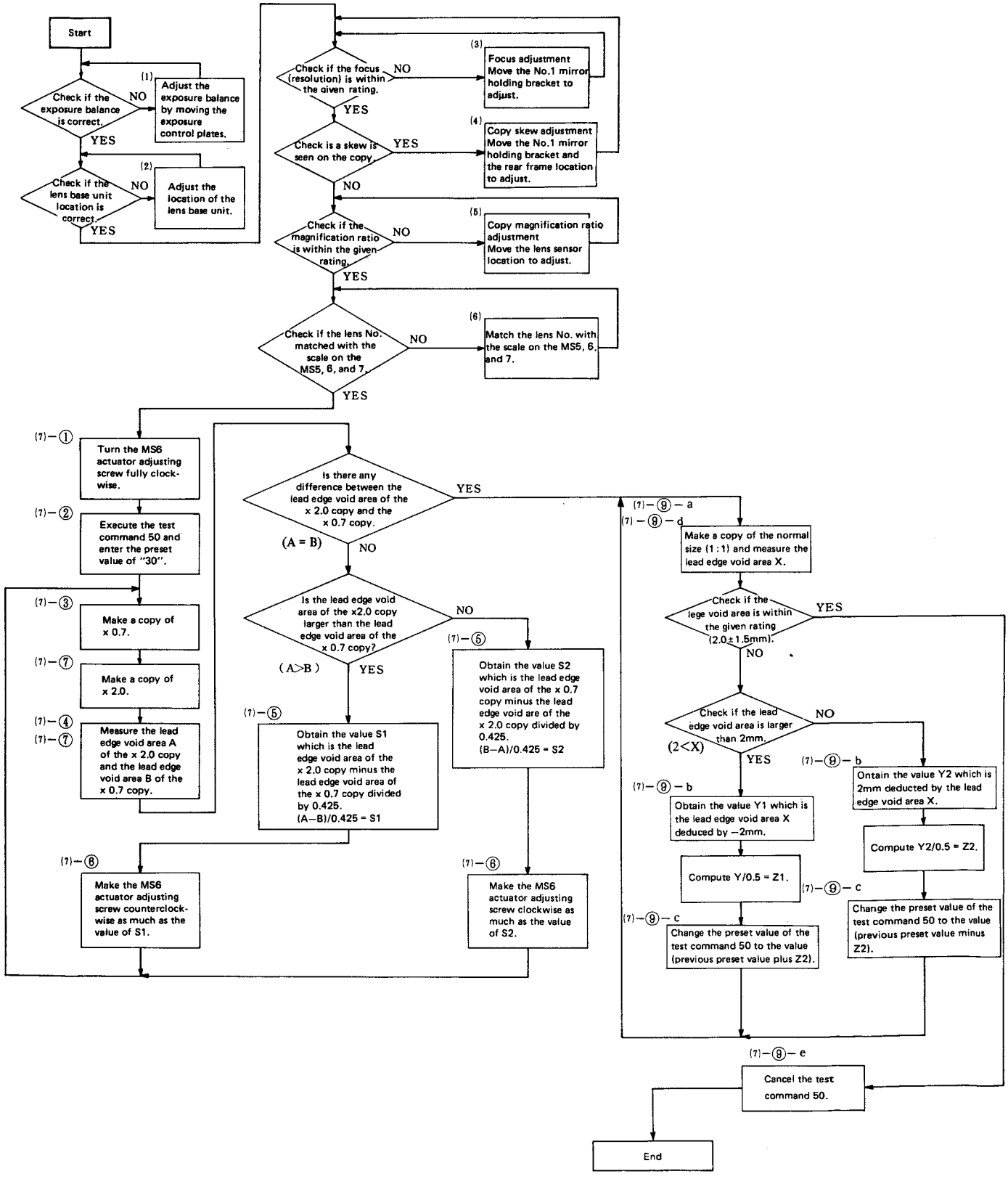

- Installation of the lamp
  The location of the blank/void lamp differs, depending on the AB and inch series.


Void lamp
(AB series)
(Inch series)
To install the lamp, insert the protrusions on the lamp through the cuts in the lamp PWB and turn it clockwise.

## 3. Adjustments

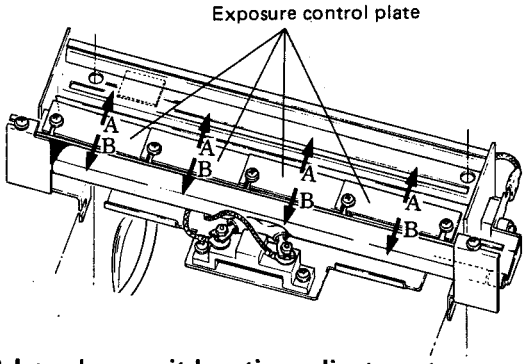
### Optical system adjustment procedure

Follow the flowchart below for adjustment of the optical system, in order to permit production of a proper copy.


Start
Check if the exposure balance is correct.
NO
(1) Adjust the exposure balance by moving the exposure control plates.
YES
Check if the lens base unit location is correct.
NO
(2) Adjust the location of the lens base unit.
YES
Check if the focus (resolution) is within the given rating.
NO
(3) Focus adjustment Move the No.1 mirror holding bracket to adjust.
YES
Check is a skew is seen on the copy.
YES
(4) Copy skew adjustment Move the No.1 mirror holding bracket and the rear frame location to adjust.
NO
Check if the magnification ratio is within the given rating.
NO
(5) Copy magnification ratio adjustment Move the lens sensor location to adjust.
YES
Check if the lens No. matched with the scale on the MS5, 6, and 7.
NO
(6) Match the lens No. with the scale on the MS5, 6, and 7.
YES
(7)-① Turn the MS6 actuator adjusting screw fully clock-wise.
(7)-② Execute the test command 50 and enter the preset value of "30".
(7)-③ Make a copy of x 0.7.
(7)-⑦ Make a copy of x 2.0.
(7)-④ (7)-⑦ Measure the lead edge void area A of the x 2.0 copy and the lead edge void area B of the x 0.7 copy.
Is there any difference between the lead edge void area of the x 2.0 copy and the x 0.7 copy.
YES
(A = B)
NO
Is the lead edge void area of the x2.0 copy larger than the lead edge void area of the x 0.7 copy?
NO
(A>B)
YES
(7)-⑤ Obtain the value S1 which is the lead edge void area of the x 2.0 copy minus the lead edge void area of the x 0.7 copy divided by 0.425. (A−B)/0.425 = S1
(7)-⑤ Obtain the value S2 which is the lead edge void area of the x 0.7 copy minus the lead edge void are of the x 2.0 copy divided by 0.425. (B−A)/0.425 = S2
(7)-⑥ Make the MS6 actuator adjusting screw counterclock-wise as much as the value of S1.
(7)-⑥ Make the MS6 actuator adjusting screw clockwise as much as the value of S2.
(7)-⑨-a
(7)-⑨-d Make a copy of the normal size (1 : 1) and measure the lead edge void area X.
Check if the lege void area is within the given rating (2.0±1.5mm).
YES
NO
Check if the lead edge void area is larger than 2mm.
NO
(2<X)
YES
(7)-⑨-b Obtain the value Y1 which is the lead edge void area X deduced by −2mm.
(7)-⑨-b Ontain the value Y2 which is 2mm deducted by the lead edge void area X.
Compute Y/0.5 = Z1.
(7)-⑨-c Change the preset value of the test command 50 to the value (previous preset value plus Z2).
Compute Y2/0.5 = Z2.
(7)-⑨-c Change the preset value of the test command 50 to the value (previous preset value minus Z2).
(7)-⑨-e Cancel the test command 50.
End

### (1) Exposure balance adjustment

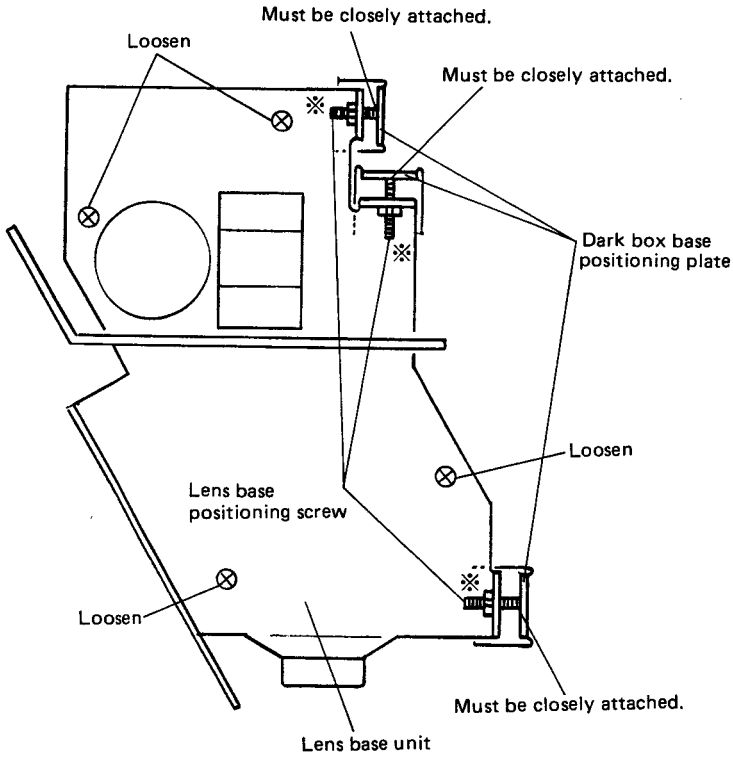
The exposure balance has to be adjusted whenever the copy lamp is replaced. Make a half-tone copy in the normal (1:1) mode, then adjust the exposure balance by moving the exposure control plates in the arrow directions A or B. Direction A makes the exposure darker and direction B makes the exposure lighter.




### (2) Lens base unit location adjustment

① Move and adjust the lens base unit so that three lens base positioning screws attached to the lens base unit are closely attached to the dark box positioning plate at three locations.

② Fix the lens base unit.




NOTE: Never try to move the lens base positioning screws. (*)

### (3) Focus adjustment

Rating

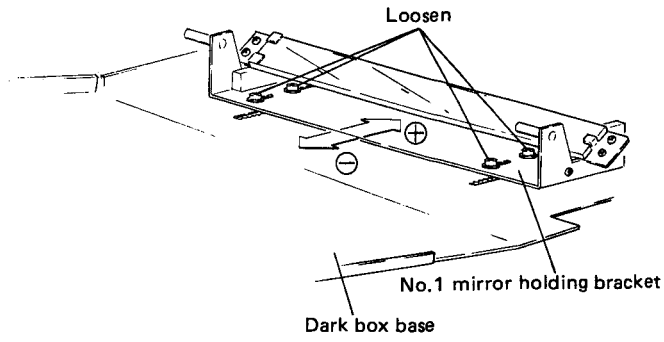
| | Center | Corner |
|---|---|---|
| Normal mode | 5 lines/mm | 4.5 lines/mm |
| Enlarge mode | 4.5 lines/mm | 4.0 lines/mm |
| Reduce mode | 3.6 lines/mm | 3.2 lines/mm |

Focus adjustment is required whenever the lens base unit is replaced.

(Adjusting method)

① Set the copier in the normal (1:1) mode.

② Move the No.1 mirror holding bracket in the arrow direction to adjust the focus.




NOTE: The No.1 mirror holding bracket securing screw cannot be removed unless the No.1 mirror is removed.

Follow the direction to adjust the focus (No.1 mirror position), whenever the lens base unit has been replaced.

① Mark the position of the No.1 mirror holding bracket on the Dark box base.

② Deduct the lens number of the new lens unit from the lens number of the old lens unit. The lens number is printed on the label attached on the lens unit base.

(Ex):

Old lens unit: No. −2.0

New lens unit: No.+3

New lens unit number − old lens unit number = +3 − (−2) = +5.

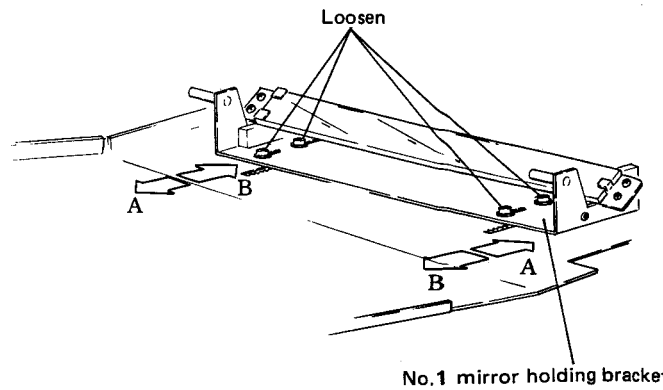
③ If the result is positive, move the No.1 mirror holding bracket parallel from the ① marked position in the arrow direction (+) by the given number (mm) and fix it there. If the result is negative, move the bracket in the arrow direction (−).

(Ex):

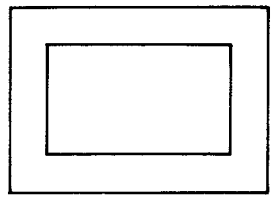
The No.1 mirror holding bracket is moved 5mm in the direction (+).

### (4) Copy skew adjustment-1

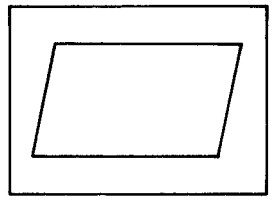
When a copy skew is seen, adjust the location of the No.1 mirror holding bracket in the arrow direction A or B.



(Example)



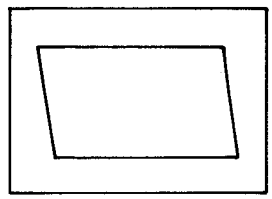
(Original)



Paper exit

(Copy A)

Move the No.1 mirror holding bracket in the arrow direction A.

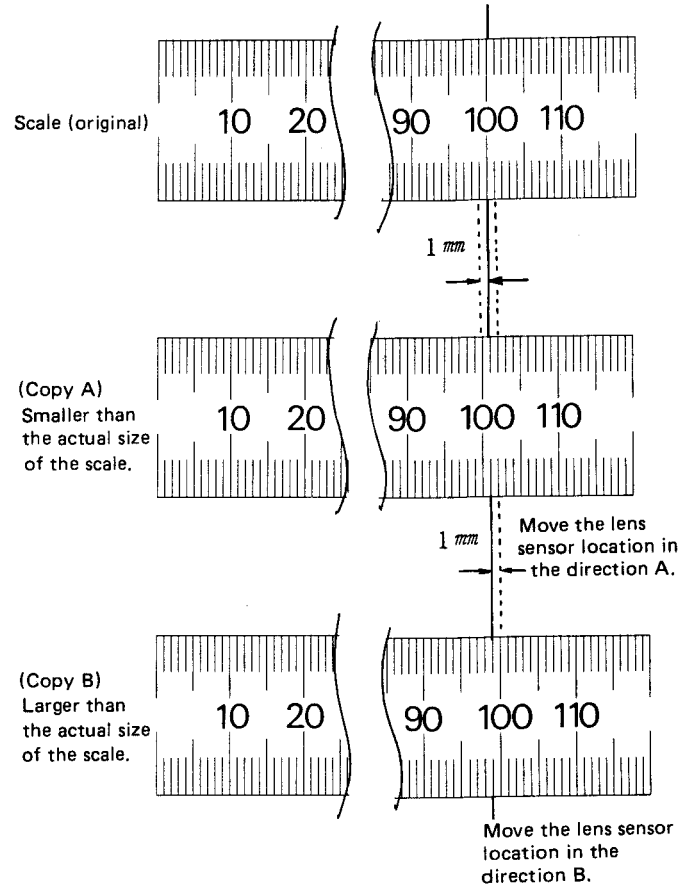


Paper exit

(Copy B)

Move the No.1 mirror holding bracket in the arrow direction B.

② Compare the scale image on the copy paper with the actual scale. If the scale was copied too large on the paper, move the lens sensor in the direction B. If too small, move the lens sensor in the direction A.




## (5) Magnification ratio adjustments

Standards

Normal mode: 1:1±1%

Enlarge mode: 1:1.22±1%, 1:2±1.5%

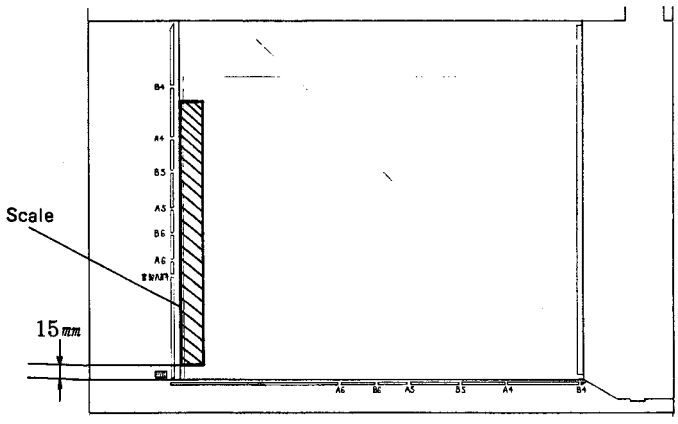
Reduce mode: 1:0.8±1%, 1:0.7±1%

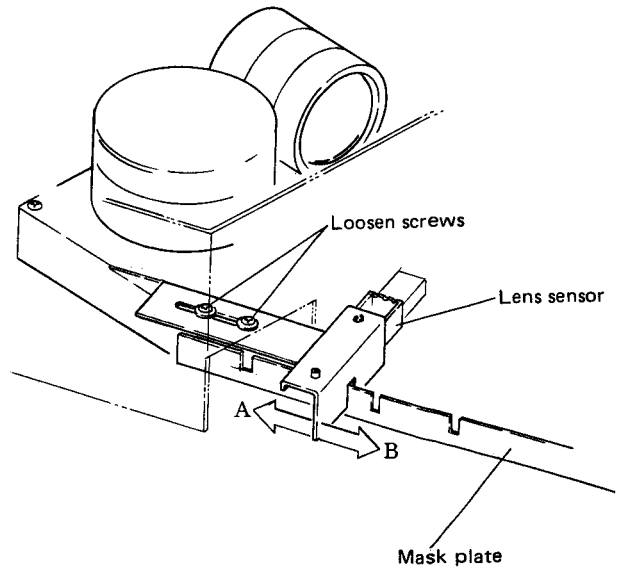
The magnification ratio must be adjusted for any of the following reasons:

- After replacement of the lens sensor.
- After replacement of the lens base unit.

(Adjusting procedure)

① Place the scale over the original table as shown in the figure, and make a copy on the B4 paper in the normal (1:1) mode.



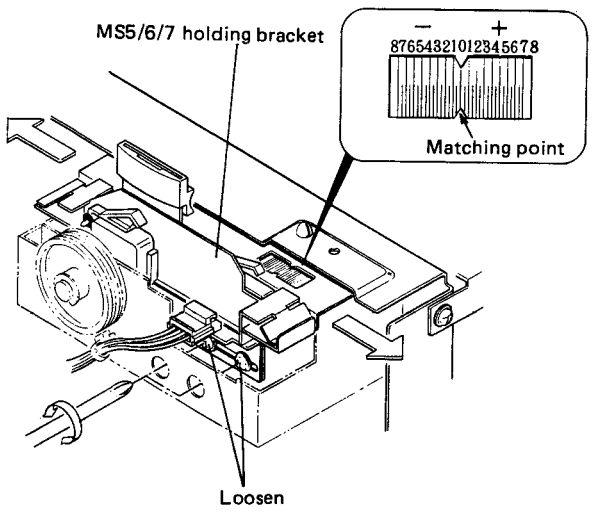
### (6) MS5, 6, 7 position adjustments

The MS5, 6, and 7 must be adjusted for any of the following reasons:

- When the No.1 mirror base is moved.

① Take note of the number on the label bonded on the lens base unit.

② Loosen screws that hold the MS5/6/7 holding bracket which is located on the upper right side of the rear frame. Move the bracket in the arrow direction until the scale on the bracket matches the number in the label.




### (7) Copy lead edge adjustment

Standards

Lead edge void area: 2.0±1.5mm

Lead edge image loss: 1.0±0.5mm

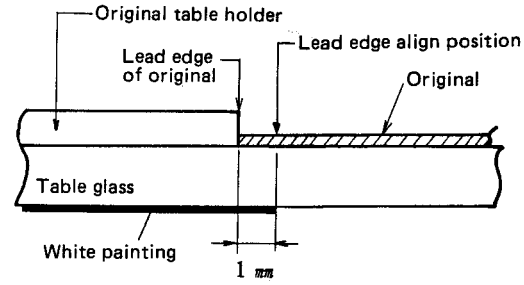
The copy lead edge must be adjusted whenever the following component is replaced or removed.

- Original table
- Clutch unit
- MS6
- PSC
- Wire holder

For the SF-7200, the original table lead edge alignment point is provided 2mm from the original table holding plate, that is, at the edge of the white painted area.

The original table lead edge alignment point is detected by the MS6 microswitch. Where the MS6 actuated after the original table is moved forward, is determined to be the lead edge reference point. The location of the adjustable MS6 actuator is provided on the original table.

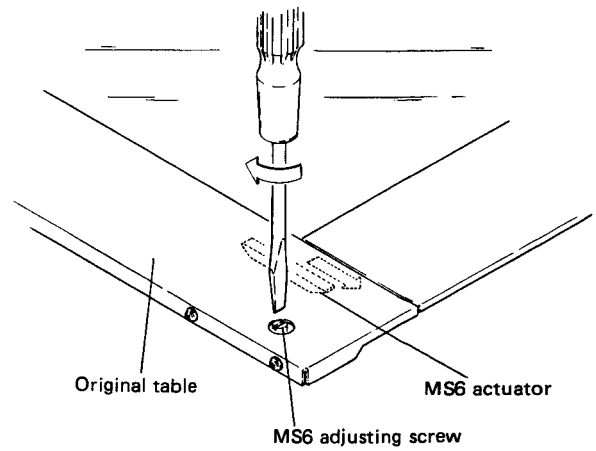
By adjusting the location of the MS6 actuator, it enables a match of the original lead edge position with the drum lead edge position. If the MS6 location is not adjusted properly, variations occur in the lead edge void area when copies are made in different magnification ratio.




To match the drum lead edge with the lead edge of the copy paper, the CPU starts to count time upon the actuation of the MS6. The PSC is actuated in connection with the counter. The PSC actuating timing can be adjusted using test command 50.

(ADJUSTING PROCEDURE)

① Turn the MS6 adjusting screw fully clockwise.




② Execute the test command 50 and preset the value "30".

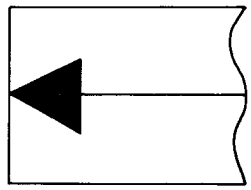
a. Enter test command 50.

- Press the following sequence of keys:
  Clear → Repeat → Zero → Pause → 5 → Zero → PSW keys.
  The previously stored value (the contents of PSC-a memory) is displayed as a number between 30 and 70.

b. Enter the preset number of "30" and press the PSW.

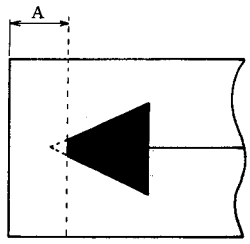
③ Make one each copy of x0.7 and x2.0.

④ Measure the lead edge void area A of the x2.0 copy and the lead edge void area B of the x0.7 copy.



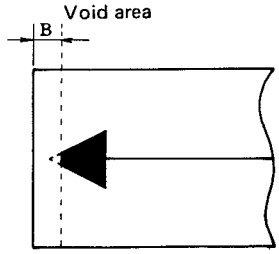
(Original)

Void area




(Enlarge copy of x 2.0)

Void area




(Reduced copy of x 0.7)

⑤ Obtain the difference between the lead edge void area A of the x2.0 copy and the lead edge void area B of the x0.7 copy, and divide the result by 0.425. If A is same as B, there is no need of performing the following computation.

In case the lead edge void area A of the x2.0 copy is larger than the lead edge void area B of the x0.7 copy (A>B):

(Ex-1)

In the case of A=22.5mm and B=16.0mm

(A−B)/0.425=S1

(A−B)/0.425=(22.5−16.0)/0.425=15.3

S1=15.3 (the value under the decimal point must be rounded by 4/5).

In case the lead edge void area A of the x2.0 copy is smaller than the lead edge void area B of the x0.7 copy (A<B):

(Ex-2)

In the case of A=5.0mm and B=7.5mm

(B−A)/0.425=S2

(B−A)/0.425=(7.5−5.0)/0.425=5.9

S2=5.9 (the value under the decimal point must be rounded by 4/5).

⑥ Make the MS6 actuator adjusting screw rotated as much as S1 or S2. The following procedure is not required when A is same as B.

In case A is greater than B, turn the MS6 actuator adjusting screw counterclockwise as much as S1.

(Ex-3)

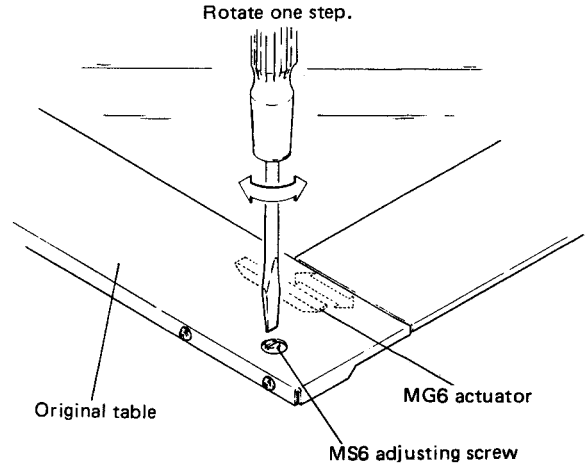
In the case of S1=15.3, the screw must be rotated 15 steps counterclockwise.

In case A is smaller than B, turn the MS6 actuator adjusting screw clockwise as much as S2.

(Ex-4)

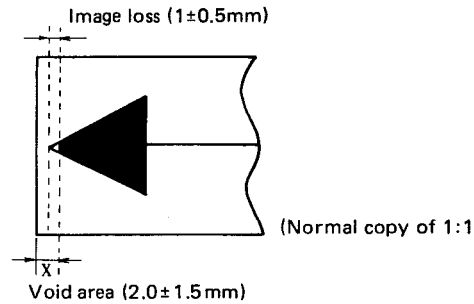
In the case of S1=5.9, the screw must be rotated 6 steps clockwise.

*Clockwise turn of the MS6 actuator adjusting screw makes A increased and B decreased. Counterclockwise turn of the MS6 actuator adjusting screw makes A decreased and B decreased.




⑦ Perform Items ③ and ④. This is not required if A is same as B.

⑧ In case there is a difference between the lead edge void area A of the x2.0 copy and the lead edge void area B of the x0.7 copy, repeat the above Items ⑤, ⑥, ③, and ④, until A becomes equal to B. This procedure is not required if A is same as B.




a. Make a copy of the normal mode (x1.0) and measure the lead edge void area X. If the result is within the given rating, there is no need of performing b thru d described next.

b. Obtain the difference between the lead edge void area X measured value and the lead edge void area rating (2.0mm), and divide the result by 0.5.

- In case the lead edge void area measured value X is greater than 2.0 (X>2.0):

(Ex-5)

In the case of X=5.0:

X−2=Y1

Y1/0.5=Z1

Y−2=5−2=3

Y1=3

Y1/0.5=3/0.5=6

Z1=6 (the value under the decimal point must be rounded by 4/5).

- In case the lead edge void area measured value X is smaller than 2.0 (X<2.0):

(Ex-6)

In the case of X=1.0:

2−X=Y2

Y2/0.5=Z2

2−X=2−1=1

Y2=1

Y2/0.5=1/0.5=2

Z2=2 (the value under the decimal point must be rounded by 4/5).

c.

- In case the lead edge void area measured value X is greater than 2.0 (X>2.0):

Add the preset value in the test command 50 with the value of Z1 obtained in b. above, and set it as the new preset value.

(Ex-7)

In case the test command preset value is 30 with Z1=6:

Preset value + Z1=30+6=36

Enter the preset value of 36 anew.

- In case the lead edge void area measured value X is smaller than 2.0 (X<2.0):

Subtract the preset value in the test command 50 with the value of Z2 obtained in b. above, and set it as the new preset value.

(Ex-8)

In case the test command preset value is 50 with Z2=2:

Preset value − Z2=50−2=48

Enter the preset value of 48 anew.

Enter a number between 30 and 70 and press the PSW. (Z1 or Z2)

To obtain a larger void area, enter a smaller value. To obtain a smaller void area, enter a larger value. Difference of one preset step makes the void area changed by 0.5mm.

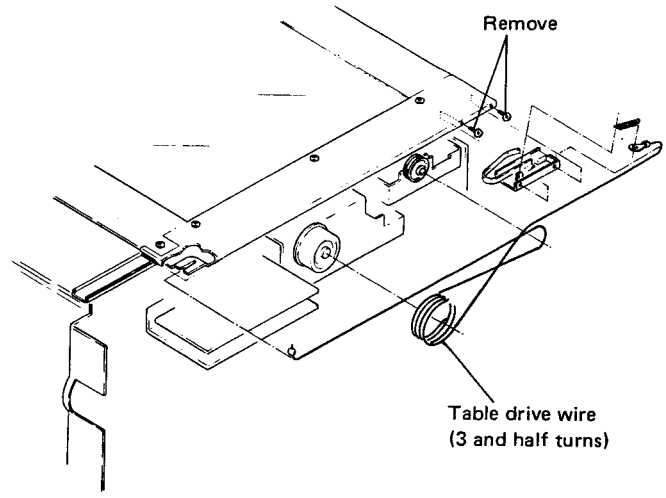
d. Make a copy in the normal mode (x1.0) and check if the lead edge void area X is within the given rating. If it is not within the given rating, repeat Items b thru d above.

e. Cancel the test command 50.
Press the Clear key.

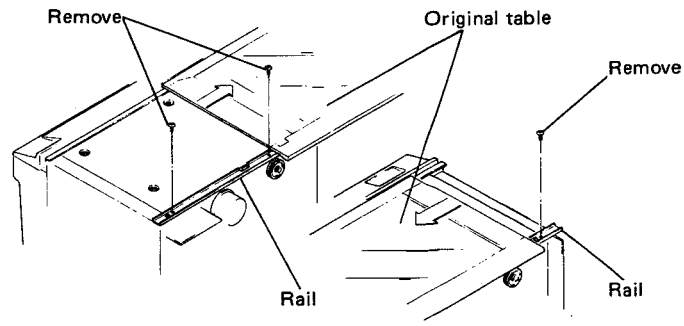
## 4. Assembly and Disassembly

### (1) Original table

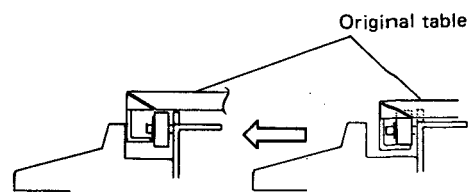
① Remove the original table drive wire.



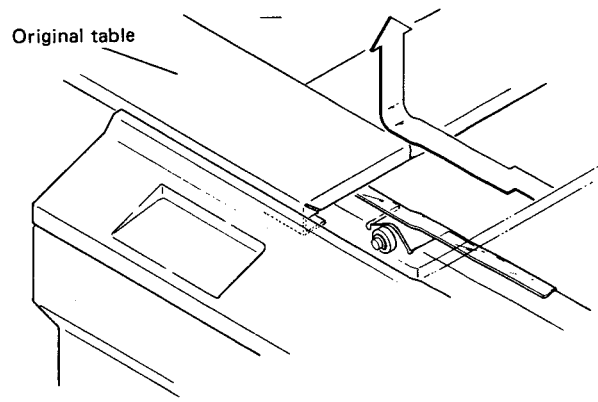

② Move the original table back and forth, and remove three screws that secure the rail.




③ Move the original table all the way towards the front frame side and take it out.



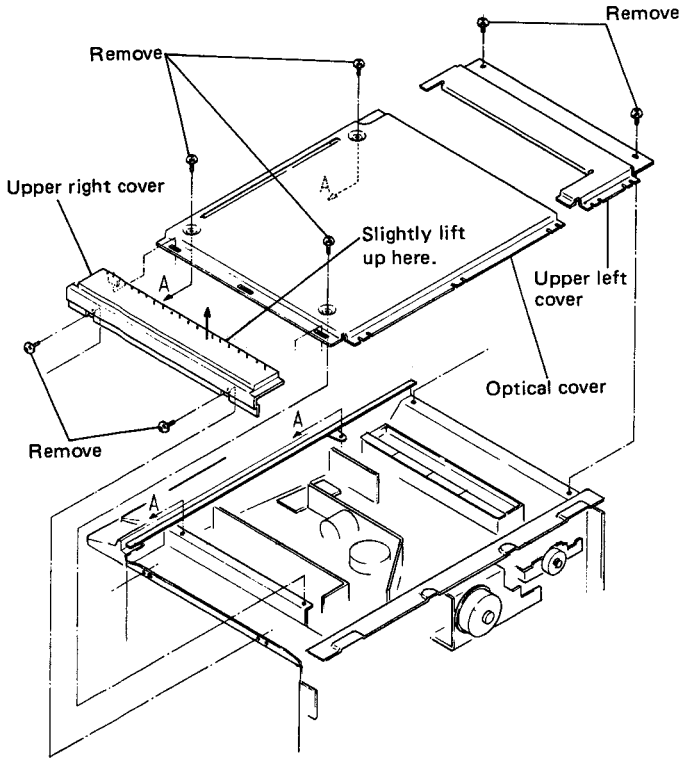

(Move the original table towards the front frame side.)



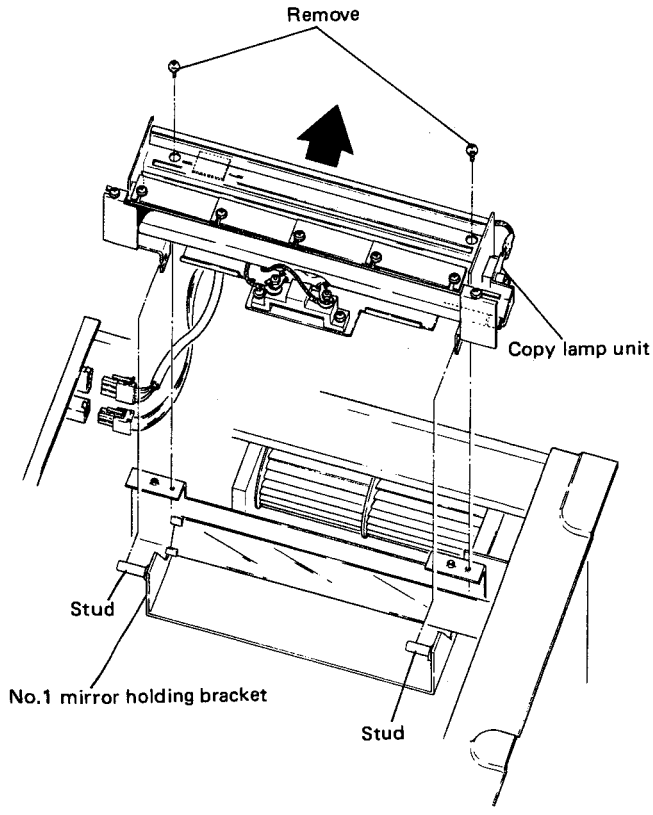
## (2) Copy lamp unit (100V series)

Removal of copy lamp unit

① Remove the upper right cover, upper left cover, and the optical cover.

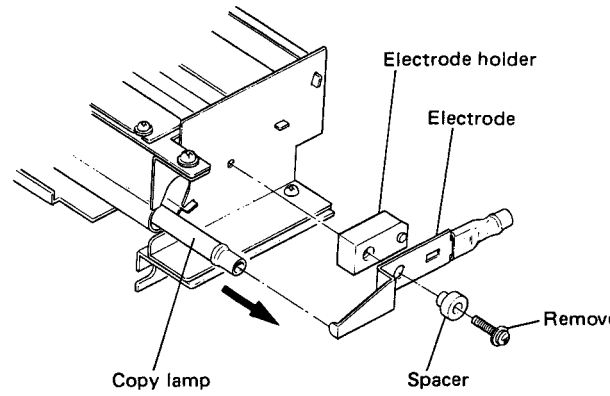



② Remove two screws that secure the copy lamp unit. Move the copy lamp unit in the arrow direction. Remove the No.1 mirror holding bracket from the studs.



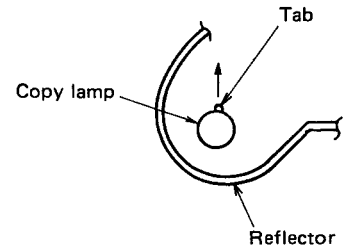

Removal of copy lamp

Remove the copy lamp electrode and remove the copy lamp in the arrow direction.



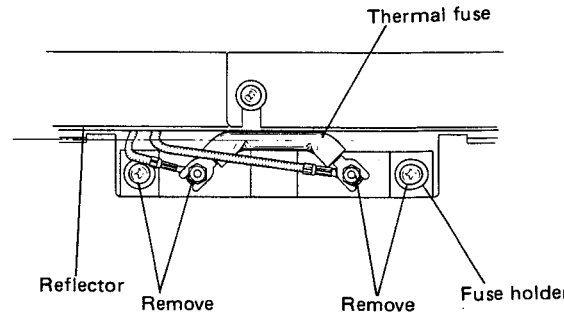

Installation of copy lamp

Install the copy lamp with the copy lamp tab located up.




Removal of thermal fuse

Remove the thermal fuse holder and remove the thermal fuse. Note that a 150°C thermal fuse is used for the 100V series copier and 109°C fuse for the 200V series copier.

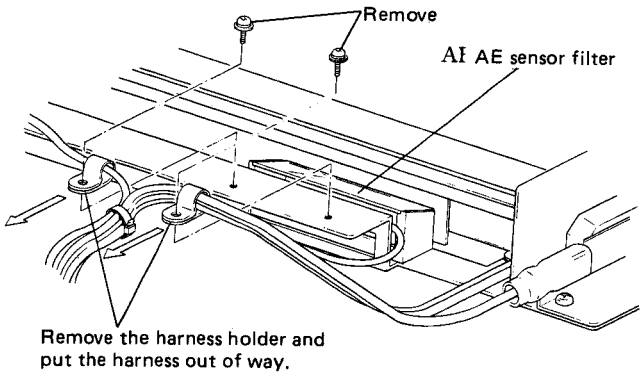



Cleaning of AE sensor

Do not directly clean the surface of the AE sensor, but clean the filter.

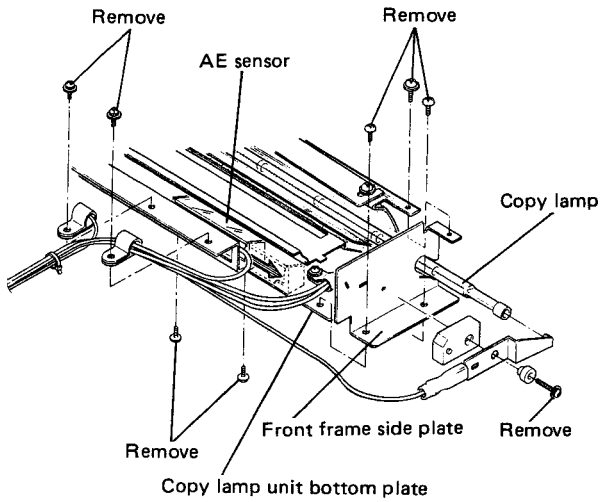
Wipe the surface of the auto exposure sensor filter with a cloth dampened with water or alcohol.

NOTE: Wiping with a dry cloth will impart an electrostatic charge to the sensor and will attract more dust.




Removal of AE sensor

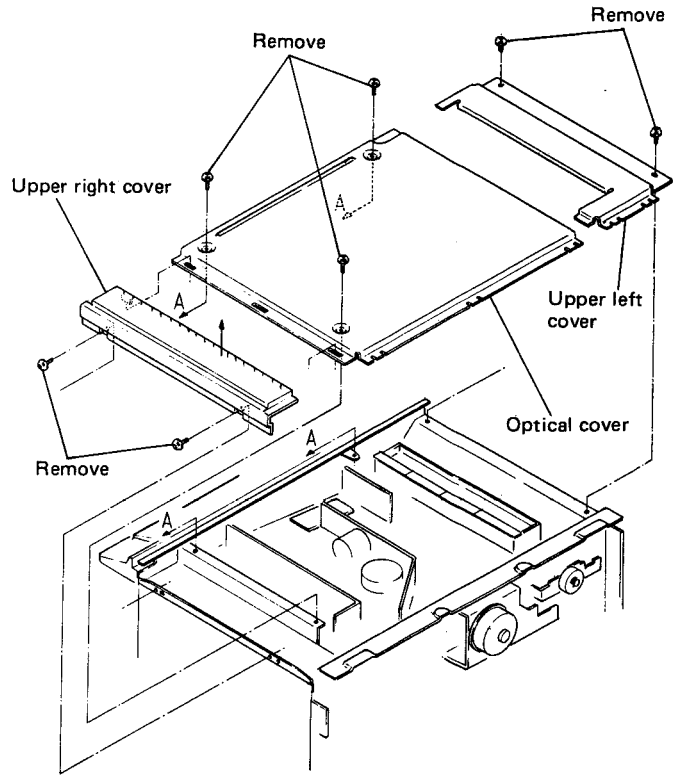
① Remove the copy lamp.
② Remove the side plate on the front frame side of the copy lamp unit.
③ Remove the AE sensor from the copy lamp unit bottom plate.



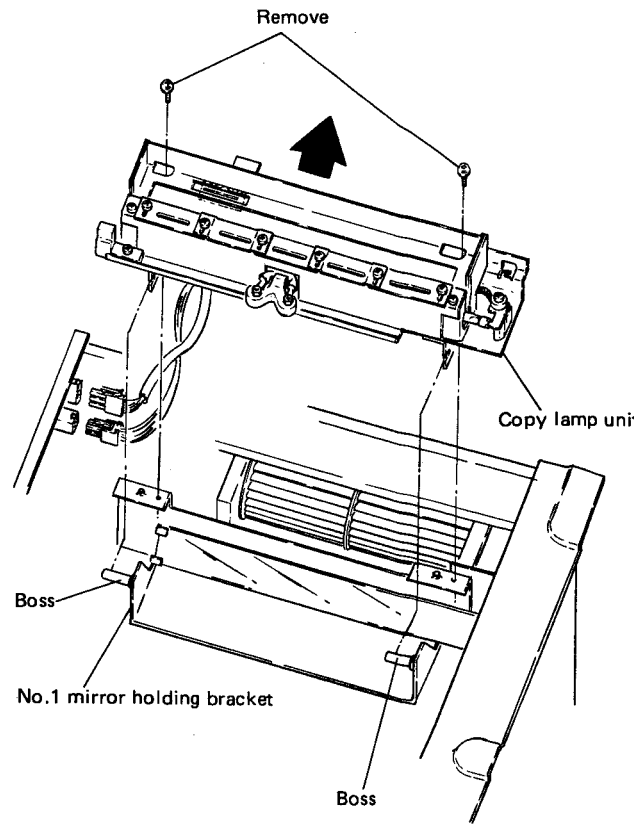

## (2) Copy lamp unit (200V series)

**a. Removal of copy lamp unit**

① Remove the upper right cover, upper left cover, and the optical cover.

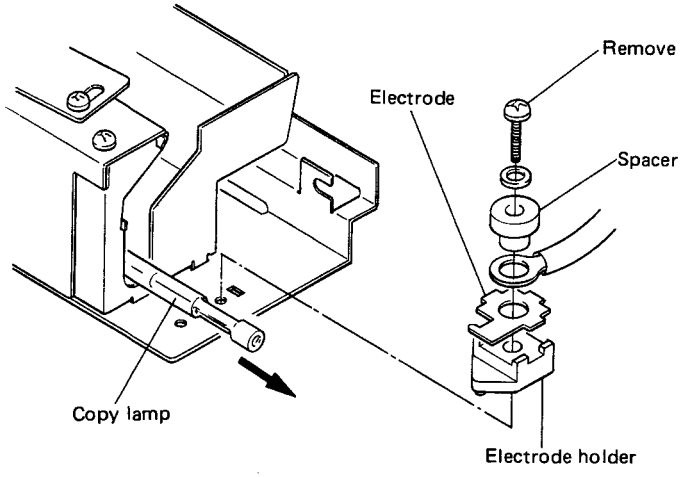



② Remove two screws that secure the copy lamp unit. Move the copy lamp unit in the arrow direction. Remove the No.1 mirror holding bracket from studs.



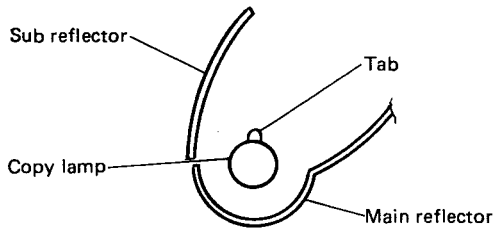
**b. Removal of copy lamp**

Remove the copy lamp electrode and remove the copy lamp in the arrow direction.



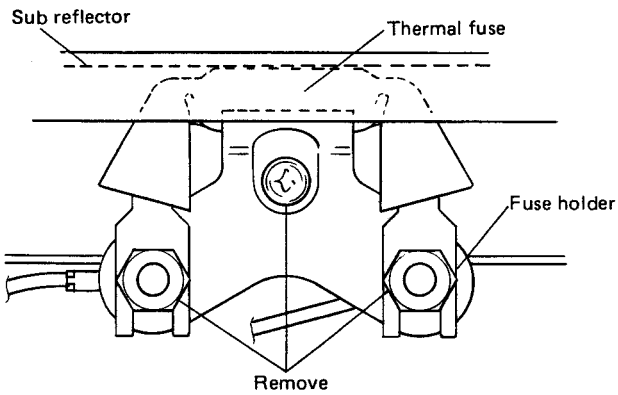

**c. Installation of copy lamp**

Install the copy lamp with the copy lamp tab located up.



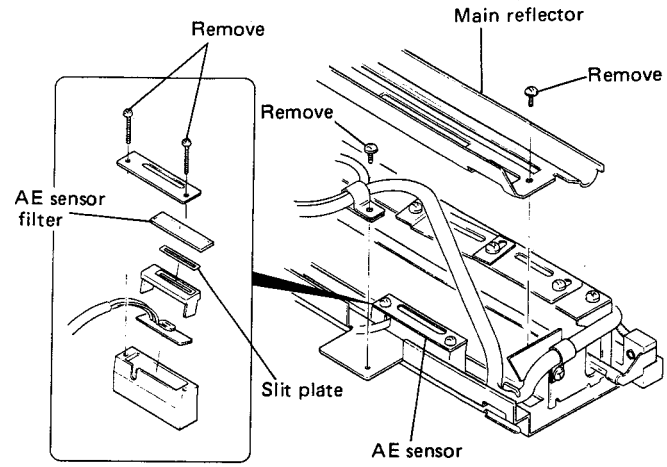

**d. Removal of thermal fuse**

Remove the thermal fuse holder and remove the thermal fuse. Note that the 109°C thermal fuse is used.




**e. Removal and cleaning of AE sensor**

① Remove the main reflector.
② Remove the harness holder and put the harness out of way.
③ Remove the AE sensor from the copy lamp unit bottom plate.



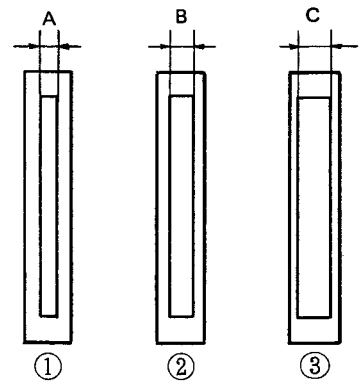

- Clean the AE sensor filter. (Do not directly clean the surface of the AE sensor)
  Wipe the surface of the auto exposure sensor filter with a cloth dampened with water or alcohol.
  NOTE: Wiping with a dry cloth will impart an electrostatic charge to the sensor and will attract more dust.

**Caution:** Caution in replacing the AE sensor.
There are three kinds of slit plates for the service parts of AE sensor.
First of all, use the slit plate of the medium gap when installing the AE sensor. Perform the copy quality adjustment, and check to see that the optimum copy is produced in the auto exposure mode. If it could not be adjusted to the optimum density after the auto exposure copy quality adjustment, use other kind of the slit for adjustment.

**Case-1:** In case the optimum density is not attained after the adjustment in the auto exposure mode because the copy tone is too dense even if the VR202 is fully set clockwise, use the slit ① that has a narrower gap for adjustment.

**Case-2:** In case the optimum density is not attained after the adjustment in the auto exposure mode because the copy tone is too light even if the VR202 is fully set counterclockwise, use the slit ③ that has a wider gap for adjustment.

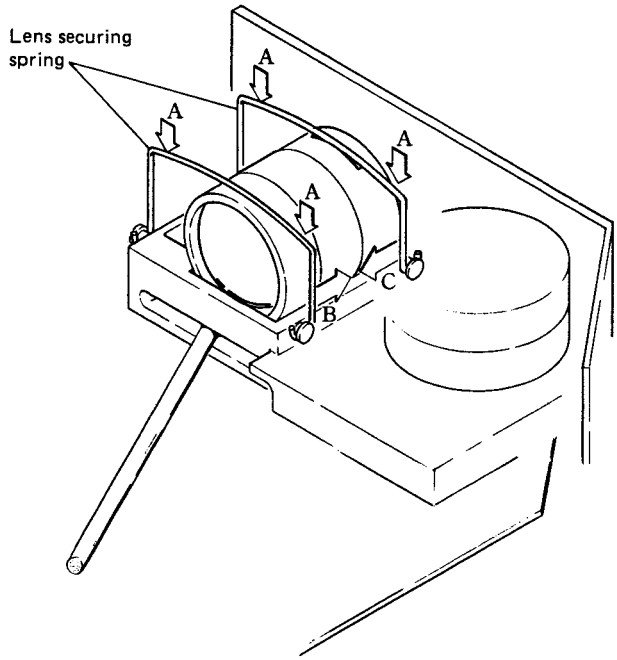
(Gap A<B<C)



### (3) Dark box unit

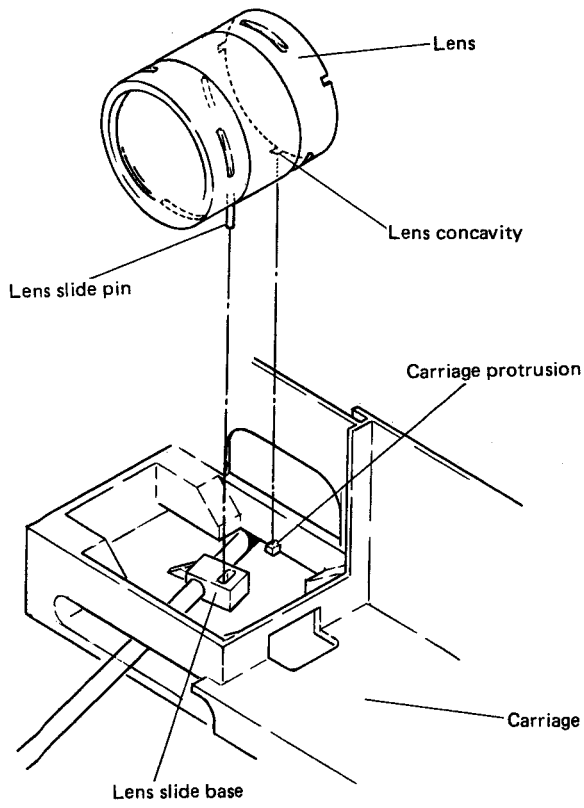
Removal of lens

NOTE: Because single component replacement is not possible, it must be replaced by a whole lens base unit when there is a defect in the lens.
Push the lens holding spring in the arrow direction A, and move it in the directions B and C to remove.




Lens location

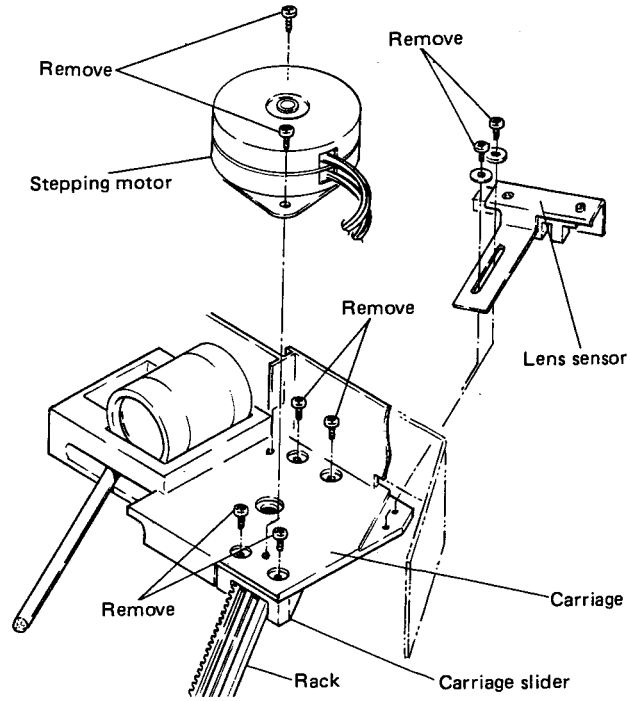
Insert the lens slide pin into the lens slide base, and engage the lens concavity with the tab on the carriage.




Removal of stepping motor and rack

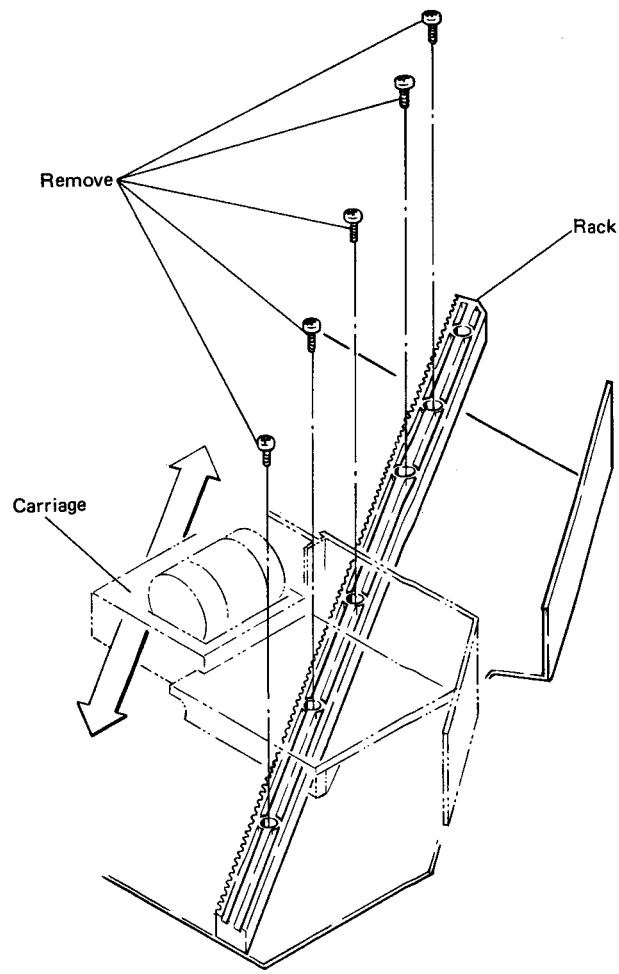
① Remove two screws that secure the stepping motor and remove the stepping motor from the carriage.

② Remove the lens sensor.



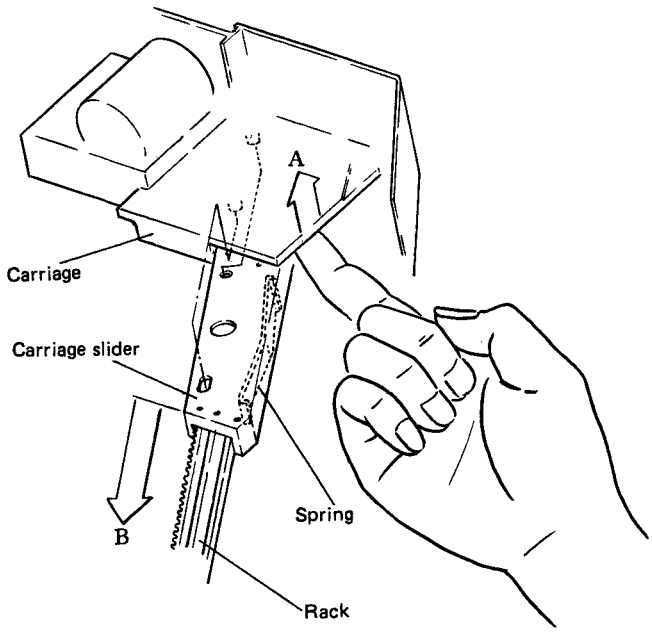

③ Remove four screws that secure the carriage slider.

④ Manually move the carriage in the arrow direction and remove five screws that secure the rack.



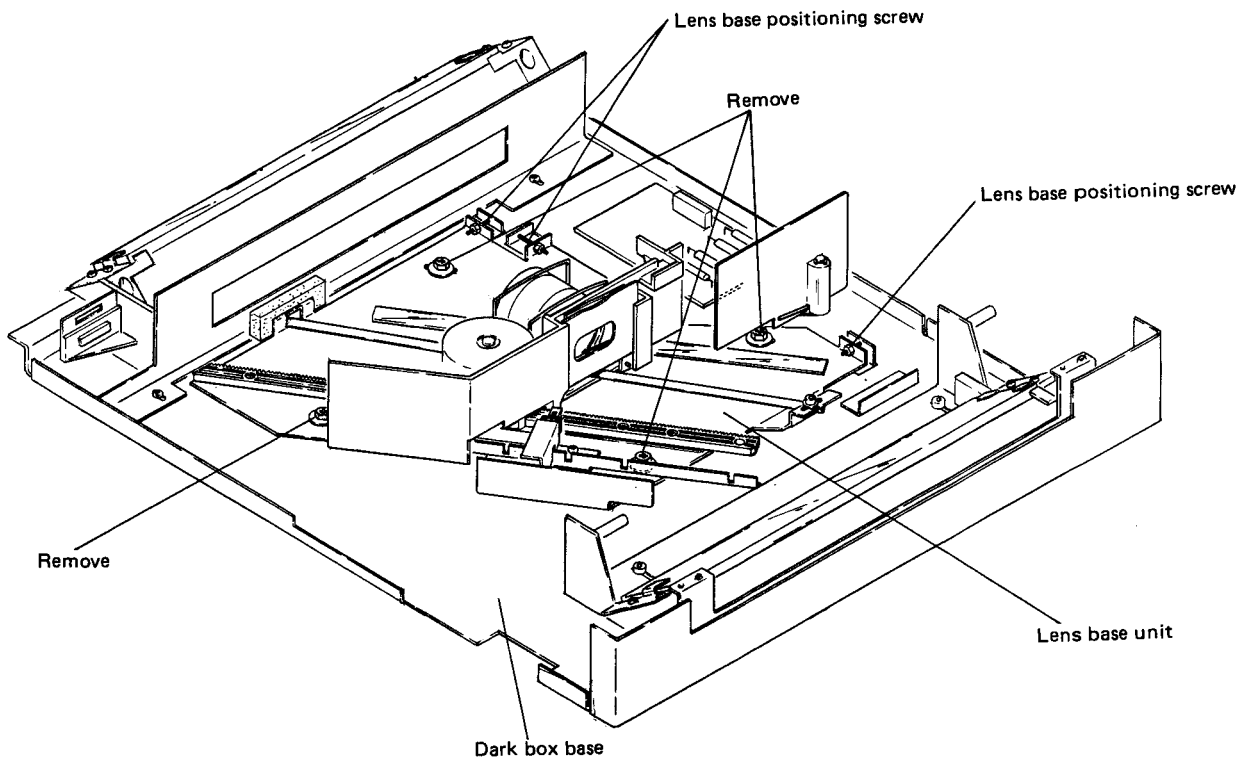
NOTE: Do not remove the carriage from the lens base (arm bar). Single component replacement is not permitted for the carriage. It has to be replaced by a whole lens base unit when replacement is required.

⑤ Lift up the end of the carriage in the arrow direction, and remove the carriage slider and the rack from the carriage (arrow direction B).



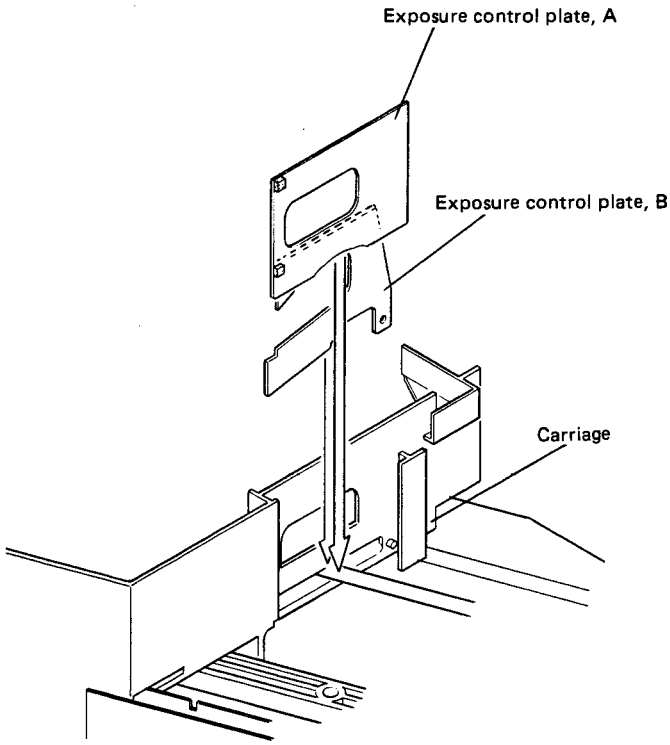

Removal of lens base unit

Remove four screws that secure the lens base unit and remove the dark box base from the lens base unit.

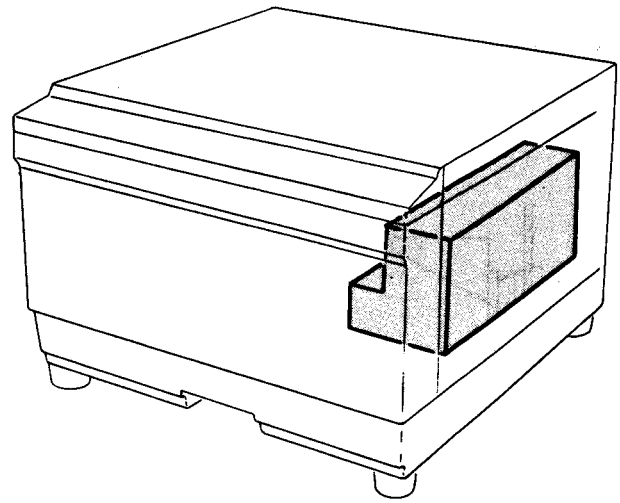


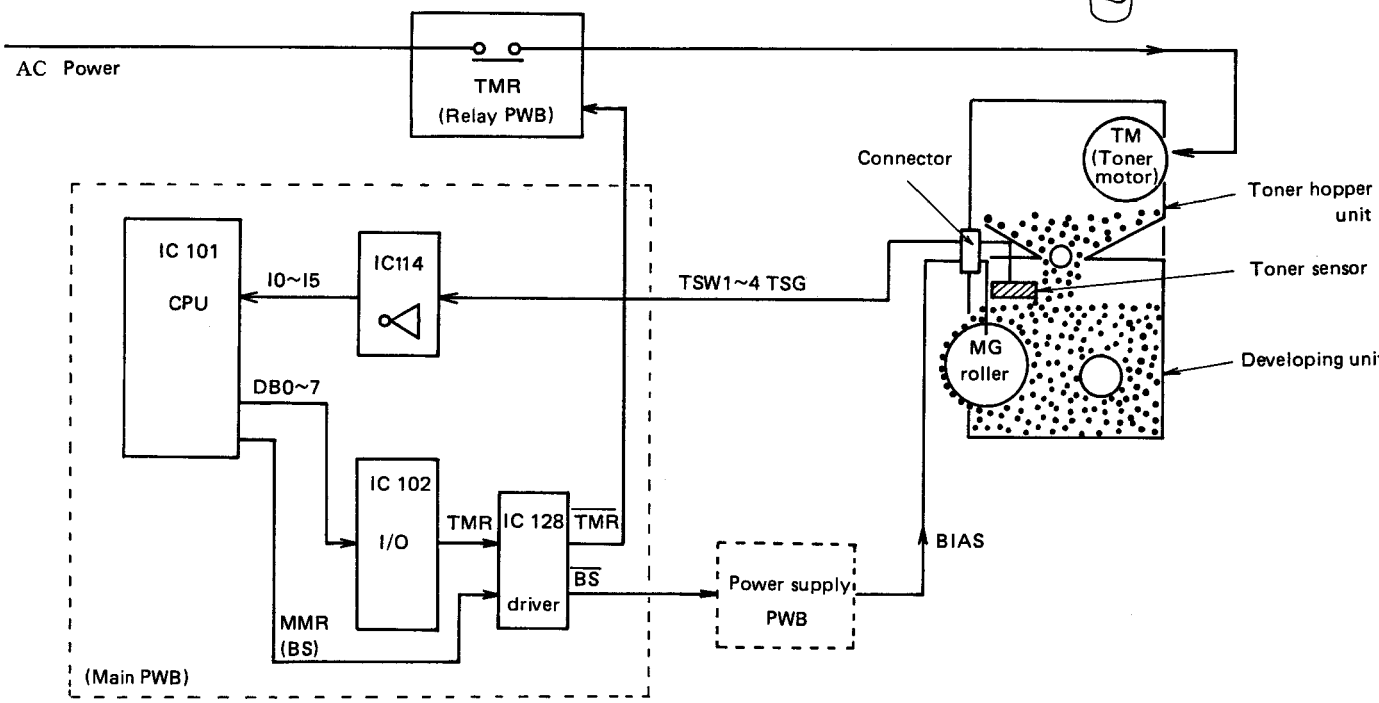
Three lens base positioning screws must be positioned so that the dark box base is closely attached to the positioning plate.

Exposure control plate locations
Install the exposure control plates in the following manner:



# [9] Developing unit



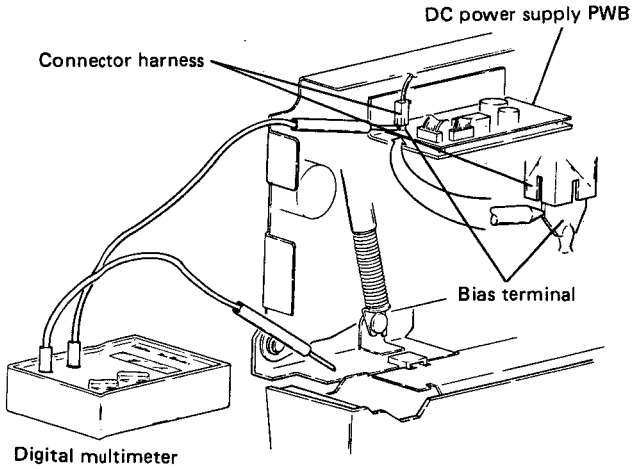



## 1. Bias Voltage Adjustment

If the bias voltage is not at the proper level (−230±10V), it must be adjusted in the following manner.

① Remove the rear cover.

② Connect the multimeter between the bias terminal and chassis ground of the power supply PWB.

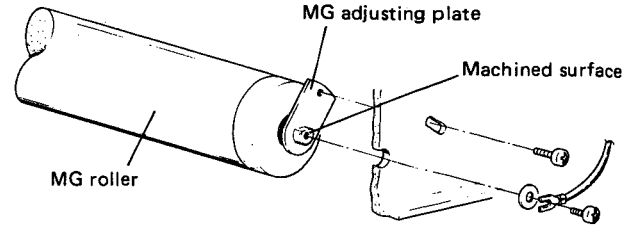



③ Enter test command 25, and adjust the VR1 so that the bias voltage should be within the given range.

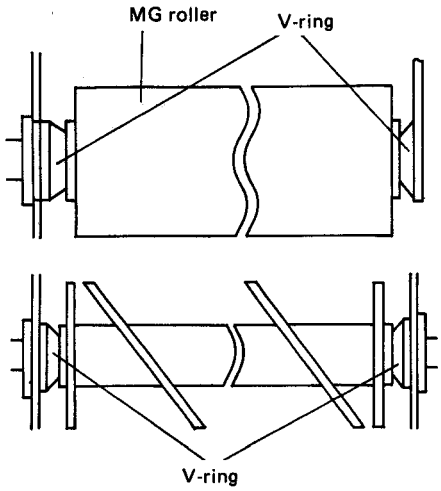
- Counterclockwise turn of the bias adjusting pot increases the voltage.
- Clockwise turn of the bias adjusting pot decreases the voltage.

## 2. MG Roller Location

① Install the MG roller with the machined surface of the roller shaft facing up.

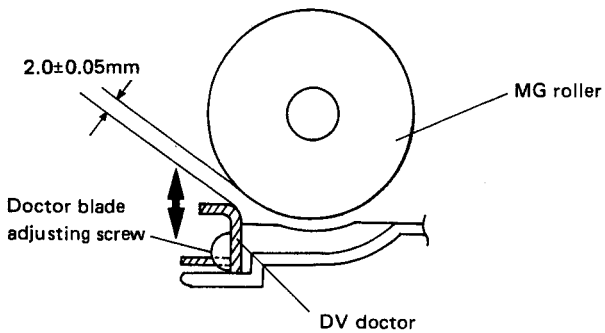


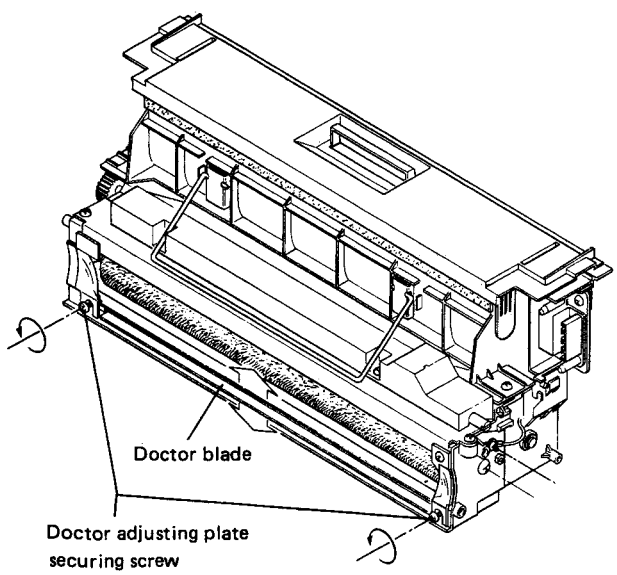
② V-ring insertion
Pay attention to the direction of the V-ring. There should be no clearance between the V-ring and the MG roller shaft.




### 3. Clearance Adjustment between the Doctor Blade and the MG Roller

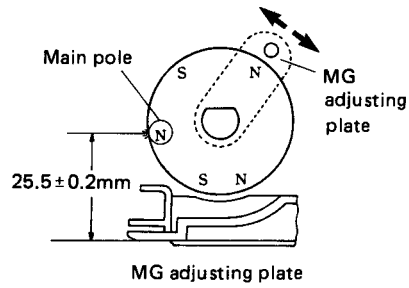
The clearance between the MG roller sleeve and the DV doctor blade should be adjusted to 2.0±0.05mm. Move the DV doctor blade in the arrow direction to adjust.
Use the DV clearance gauge UKOG-0112FCZZ.

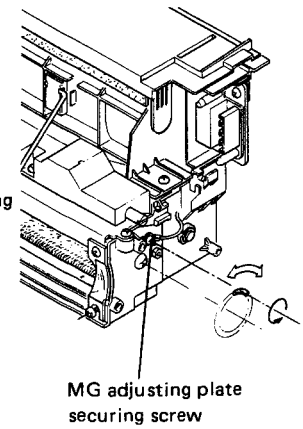



### 4. Main Pole Adjustment

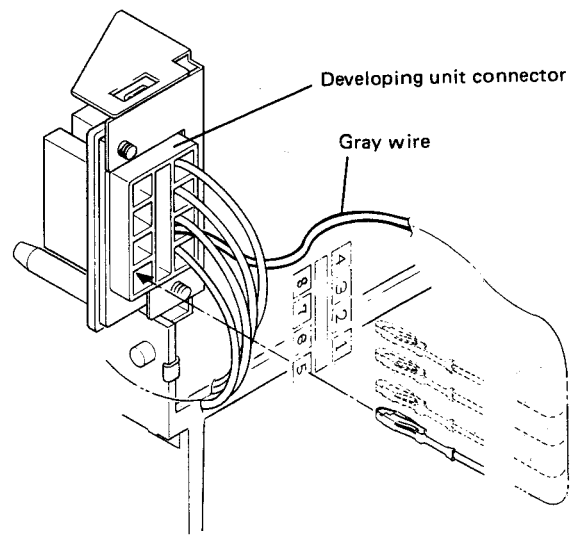
Load the developing unit with developer, and wipe a finger gently across the MG roller surface. A dark band about 10mm wide will appear to indicate the location of the main pole inside the MG roller. Adjust the center of the dark band to 25.5±0.2mm from the base of the doctor blade with the MG adjusting screw.



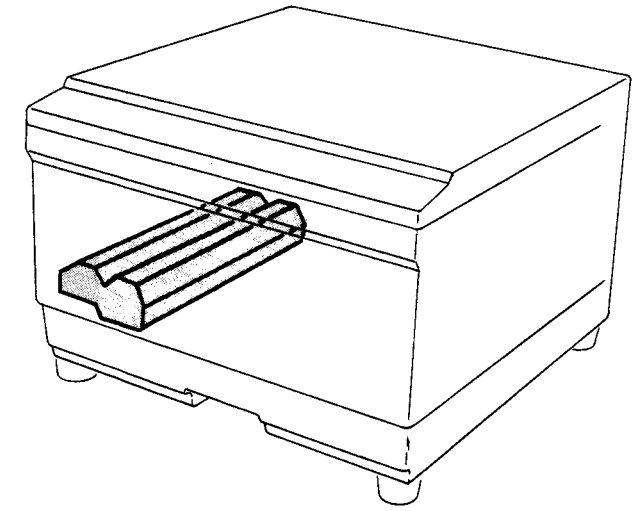

### 5. DV Connector Wiring

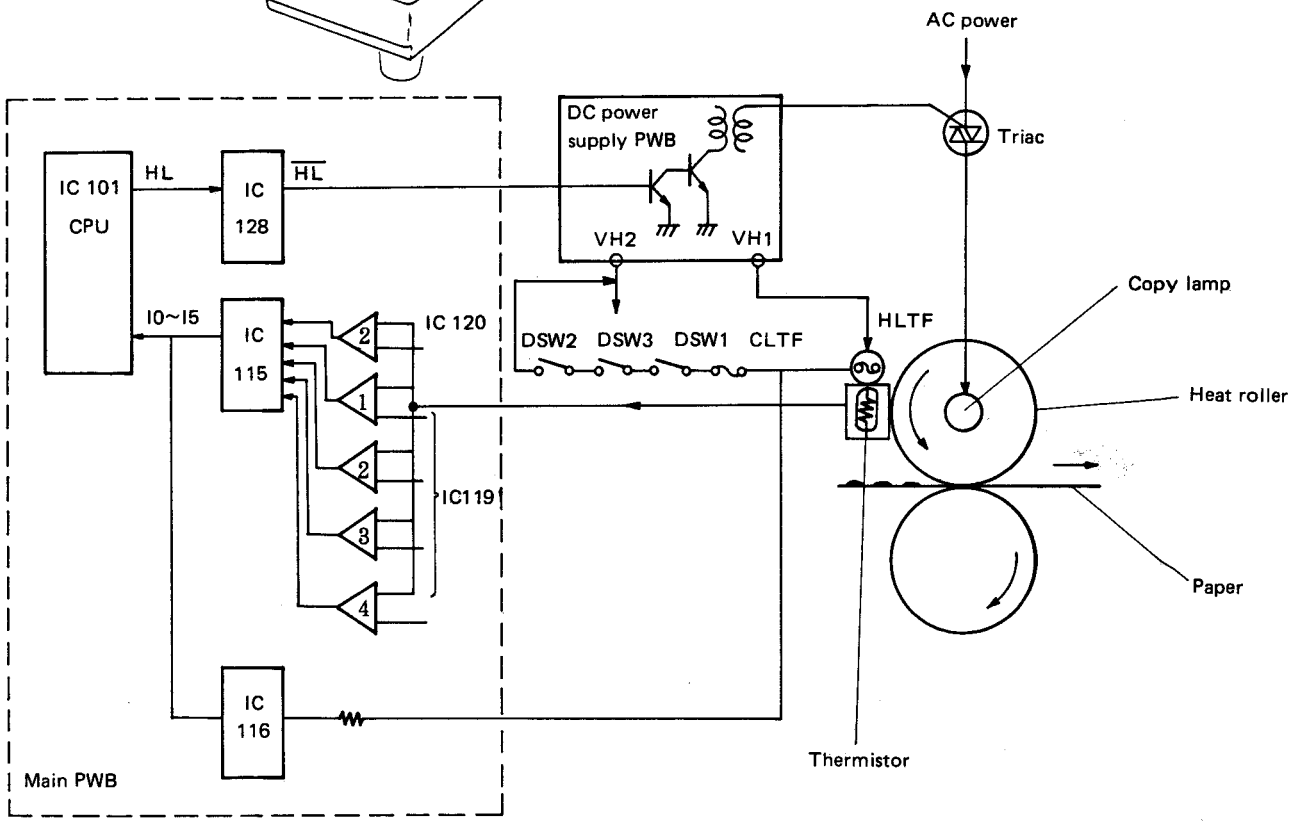
The developing unit connector wiring differs depending on the kind of developer used.
The gray wire from the #2-pin of the connector must be connected to one of #5-pin to #8-pin of the connector according to the developer kind. (See the figure below.)




#2-pin to #5-pin (TSW1): Black developing unit
#2-pin to #6-pin (TSW2): Red developing unit
#2-pin to #7-pin (TSW3): Blue developing unit
#2-pin to #8-pin (TSW4): Brown developing unit
As the #2-pin of the service parts developing unit is left unconnected, it must be connected according to the developer color used.

# [10] Fusing unit






## 1. General Description

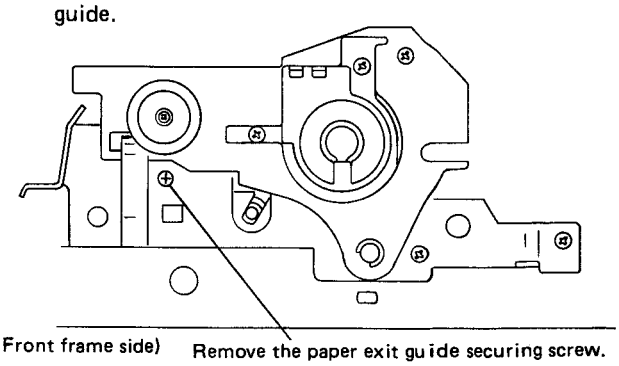
- A teflon roller is used for the upper heat roller and a silicon roller is used for the lower heat roller.
- The cleaning roller is impregnated with silicon oil to increase the cleaning effect of the heat rollers. The upper cleaning roller cleans the area where the thermistor is in contact.
- Three separator pawls are used for the upper heat roller.
- The upper heat roller surface temperature is set to 180°C and drops to 120°C in power standby.

## 2. Major Parts Replacement

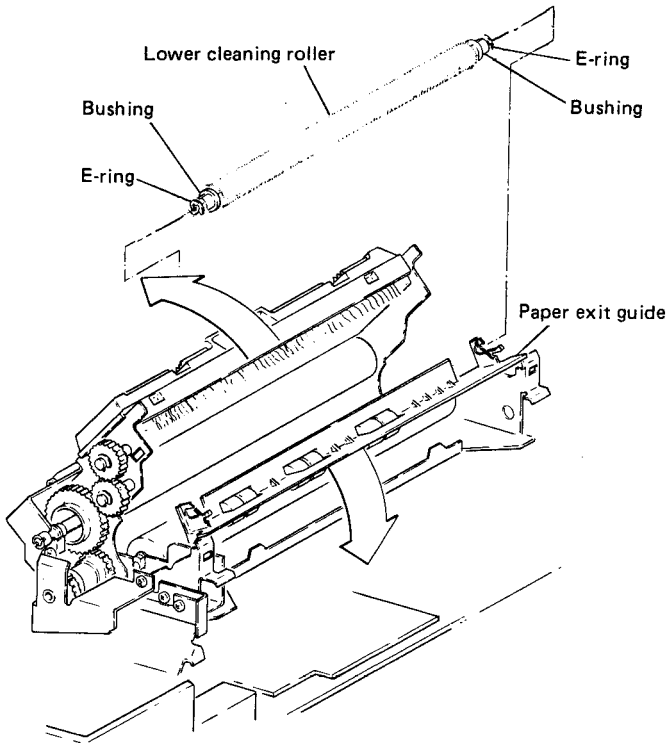
### (1) How to install the cleaning roller

Lower cleaning roller

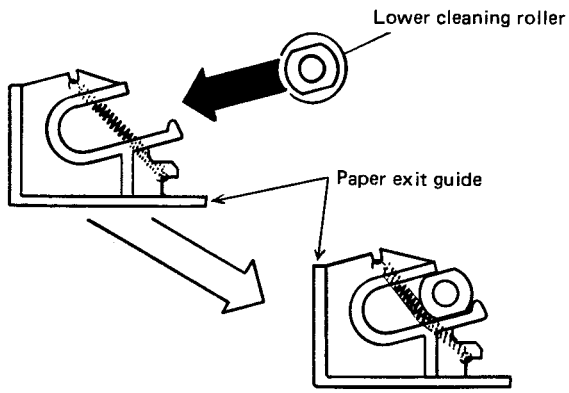
① Remove the two screws that secure the paper exit guide.




② Open the fusing unit.
③ Pivot the paper exit guide to the paper exit side.



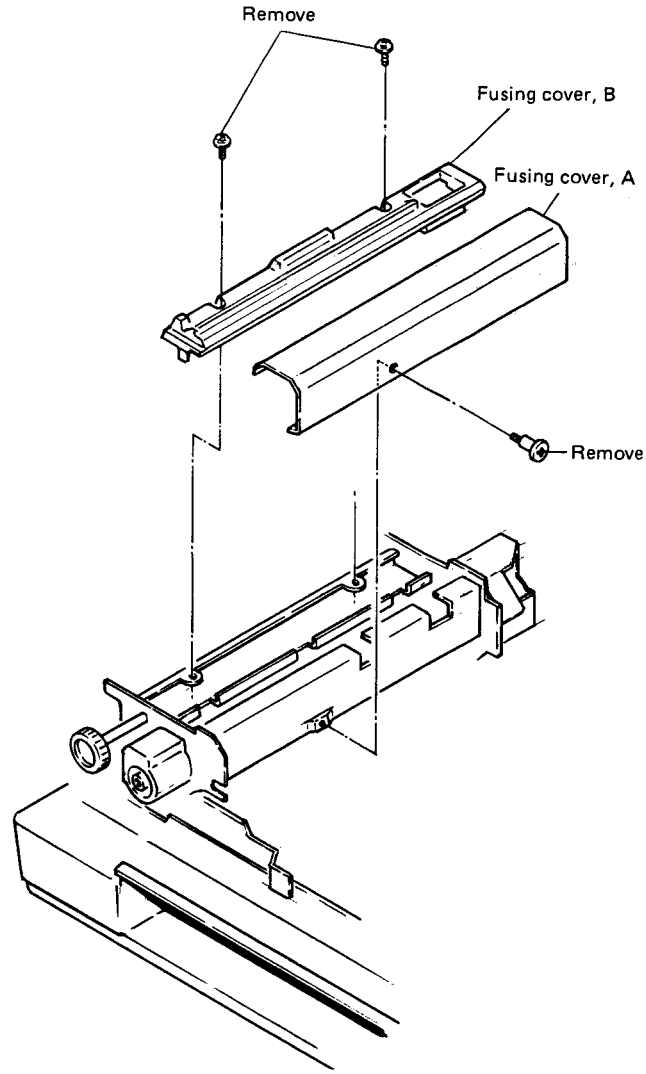

④ Place the cleaning roller on the paper exit guide and pivot the paper exit guide to the fusing roller side.



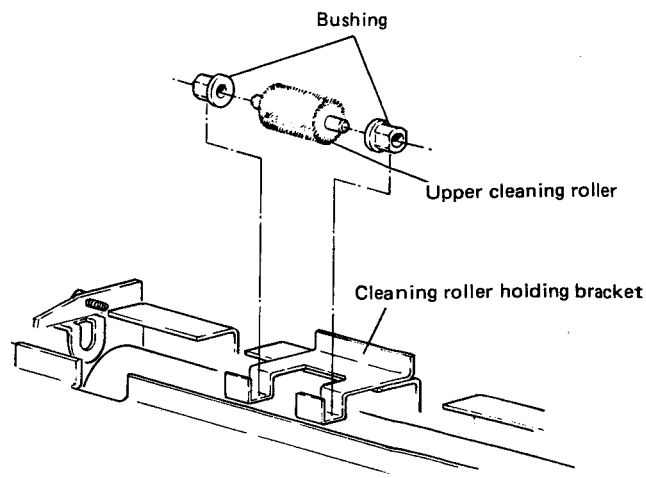

⑤ Close the fusing cover.

Upper cleaning roller

① Remove the fusing cover A.

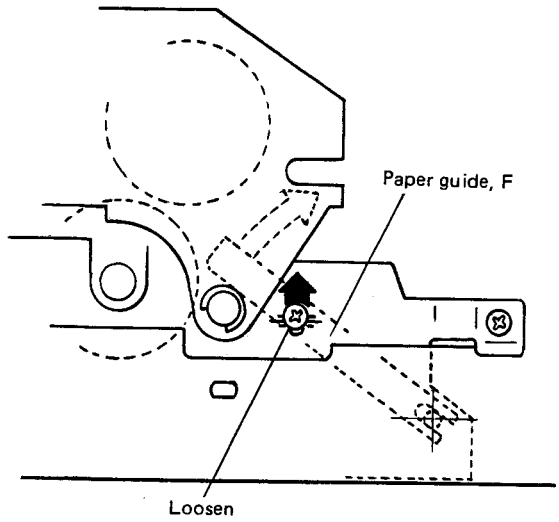



② Place the cleaning roller on the cleaning roller holding bracket.



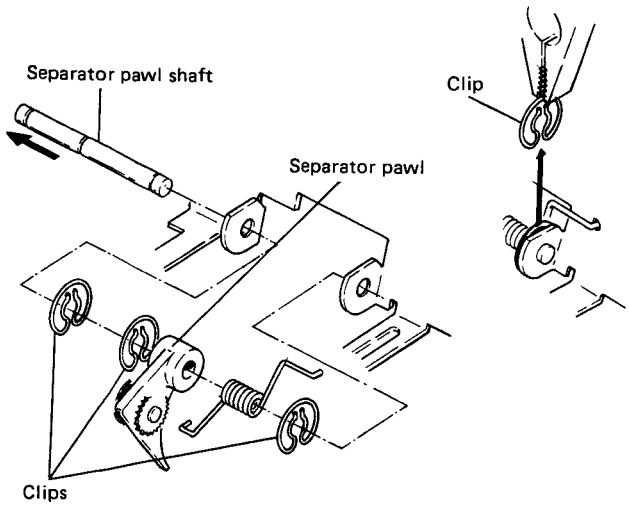
### (2) Paper guide F location

Move the paper guide F all the way up (standard position). Adjust the paper guide F location when paper creasing or misfeed is encountered.



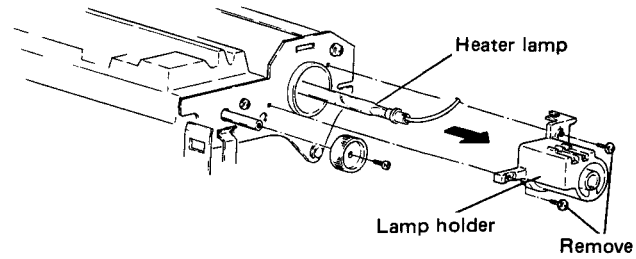

### (3) How to remove the separator pawl

① Remove the fusing cover B.
② Remove three clips that secure the separator pawl and pull out the separator pawl shaft in the arrow direction.




### (4) How to remove the heater lamp

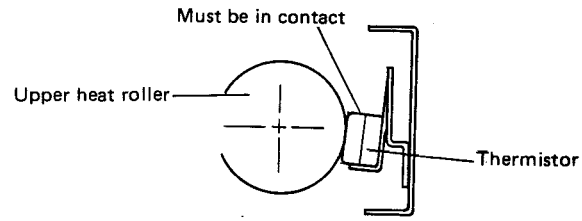
① Remove the heater lamp harness connector located on the rear frame side.
② Remove the heater lamp harness connector located on the front frame side.
③ Remove the lamp holders on both the front and rear frame sides, and remove the heater lamp from the front frame side.




### (5) Installation of thermistor and thermal fuse

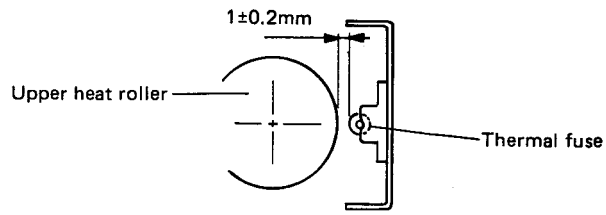
Thermistor

The thermistor must be in contact with to the fusing roller. The surface of the thermistor must be clean. If it is dirty, wipe it clean with alcohol.



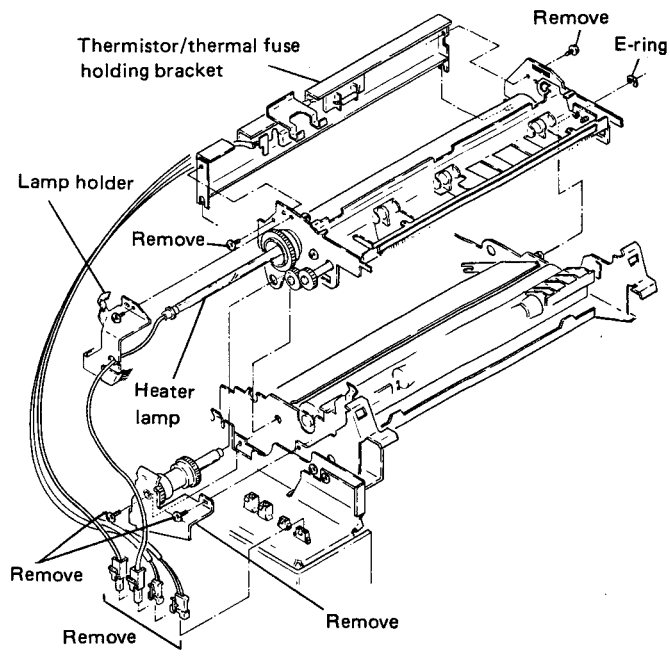

Thermal fuse

The gap between the thermal fuse and the heat roller must be 1±0.2mm.

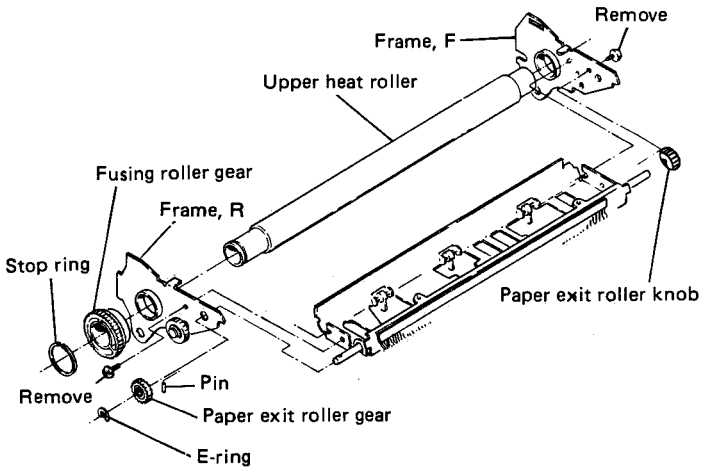



### (6) How to remove fusing roller, fusing roller frames, L and R (bushing)

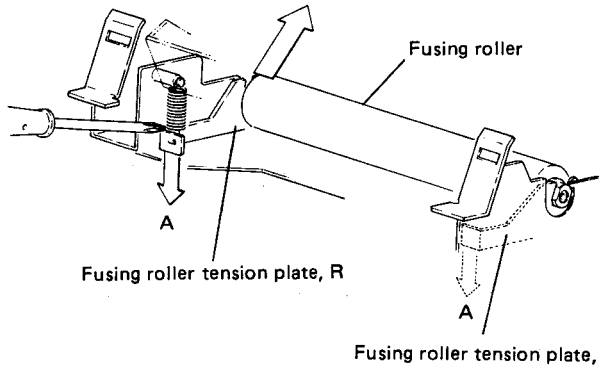
① Remove the fusing covers, A and B.
② Remove the thermistor/thermal fuse holding bracket.



③ Remove the heater lamp.
④ Remove the rear frame side lamp holder.
⑤ Remove the fusing roller gear and the paper exit roller gear.
⑥ Remove the paper exit roller knob.

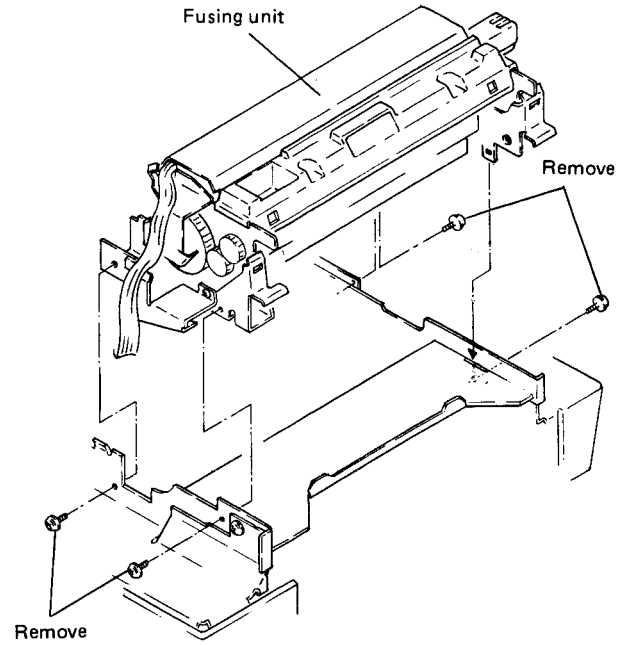



⑦ Remove the fusing roller frames, F and R, and remove the upper heat roller.
⑧ Push the fusing roller tension plates, F and R, in the arrow direction A and remove the lower fusing roller.




### (7) How to remove the fusing unit

① Remove the screws on both sides of frames that secure the fusing unit.
② Unfasten the fusing unit connector located on the rear frame side, and remove the fusing unit from the lower frame.



# [11] Copy quality adjustments

The copy quality must be adjusted for any of the following conditions:

- At the time of maintenance.
- After the drum current adjustments, after the coronas are replaced, after the corona wires are replaced, or after a high voltage unit is replaced.
- After replacing the CL-Reg PWB unit or its components.
- After adjusting the VR on the CL-Reg PWB.
- After replacing the auto exposure sensor (AE).
- After replacing the copy lamp.
- After replacing, adjusting, troubleshooting, or disassembly of the dark box unit.
- After adjusting the exposure control plate.

Adjustment procedure

① Clean the optical system (table glass, lens, mirrors, copy lamp, and reflector).

② Remove the auto exposure sensor (see page [8]-1, 12) and clean the surface of the photosensor with a cloth dampened with alcohol.

NOTE: Wiping with a dry cloth will impart an electrostatic charge to the sensor and will attract more dust.

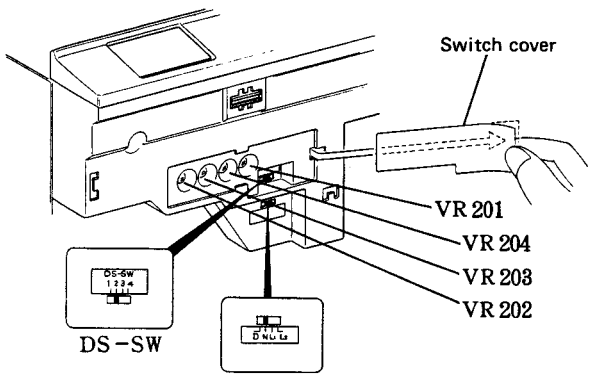
③ Slide the drum sensitivity switch (DS-SW) to a position that matches first digit of the drum grade number.

④ Make an all half tone copy on as (10" x 14", or B4) paper in the manual feed mode at 1:1. Check for an even front to rear exposure. If the copy is uneven, adjust exposure control plates (see page [8]-5).

⑤ Set the auto exposure control switch to the "N" position.

NOTE: The switch is set to "N" position when a new drum is installed. Otherwise, no switch change is required.

⑥ Make a copy of the Test Chart (UKOG-0089CSZZ). Set the manual exposure mode to 5.0 in the normal (1:1) mode. Adjust the VR201 on the CL-Reg PWB so that the 0.5 strip is slightly copied. (KODAK gray scale: 4.0 strip)




Auto exposure control switch

NOTE: Rotating the VR clockwise produces a lighter copy. Rotating it counterclockwise produces a darker copy.

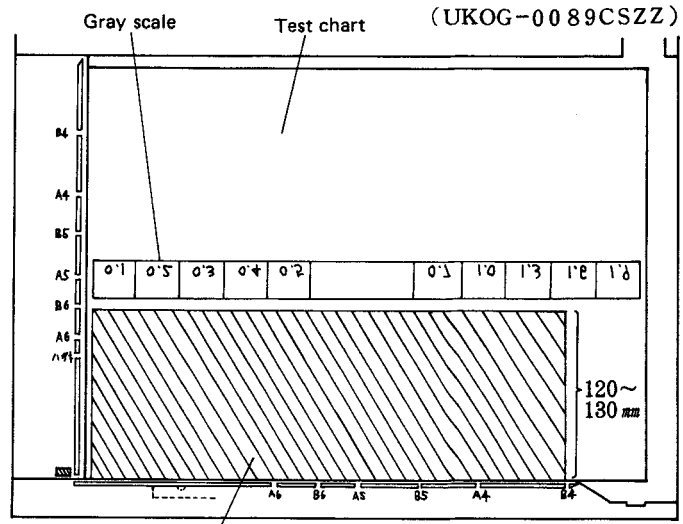
⑦ Make a copy of the gray scale with the manual exposure mode set to 1.0 in the 1:1 (normal) mode. Adjust VR203 so that the 0.1 strip of the gray scale is slightly copied. (KODAK gray scale: 1 strip)

⑧ Make a copy of the gray scale with the manual exposure mode set to 1.0 in the 1:2 mode. Adjust VR204 so that the 0.1 strip is just copied. (KODAK gray scale: A or 1 strip)

⑨ Make a copy of the gray scale with the manual exposure mode set to 2.0 in the 1:1 mode.

⑩ Change to the auto exposure mode.

⑪ Place four sheets of blank white paper, 120mm x 360mm on top of one another, in alignment to the original set position on the original table. Place the gray scale as shown below.




Place two sheets of blank white paper (B4 paper in two fold).

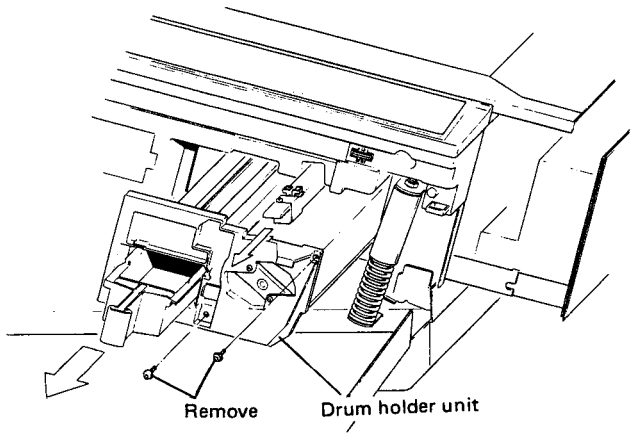
⑫ Make a copy and adjust the automatic exposure control VR202) to make the copy equal in density to the copy obtained in step 9.

NOTE: Adjusting the manual exposure controls (VR201, VR203, or VR204) changes the auto exposure. Always perform the manual exposure control adjustment first, then perform the automatic exposure control.

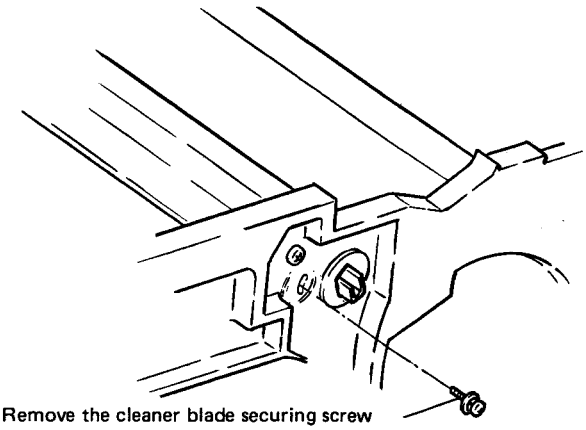
# [12] Others

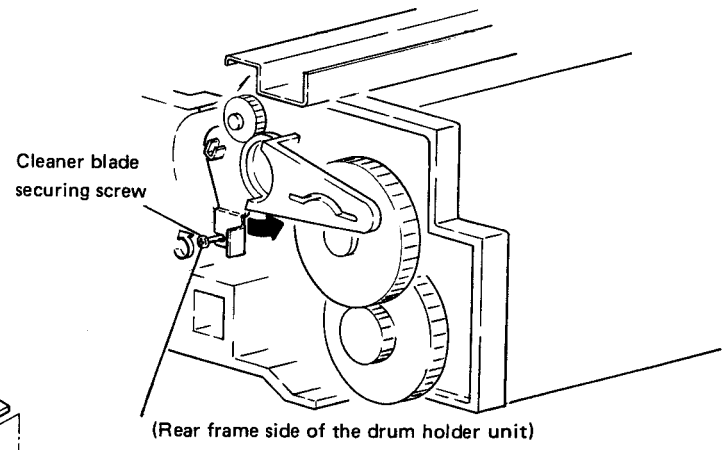
## 1. Drum and Cleaner Blade Replacement

① Reset the DV unit accessing lever and pull out the developing unit.
② Open the clam shell.
③ Remove the drum holder unit from the copier.

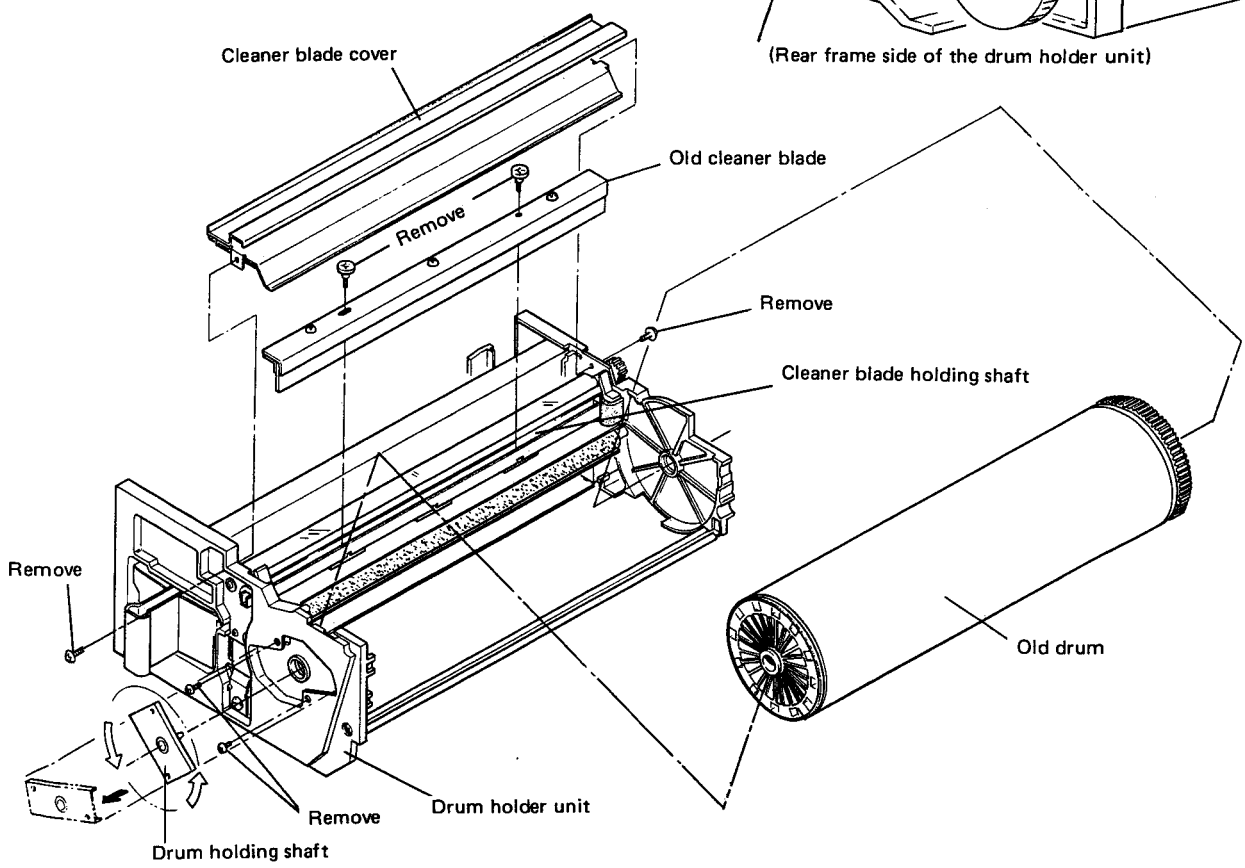



④ Remove the old drum.
⑤ Remove the cleaner blade securing screw, and release the cleaner blade tension.

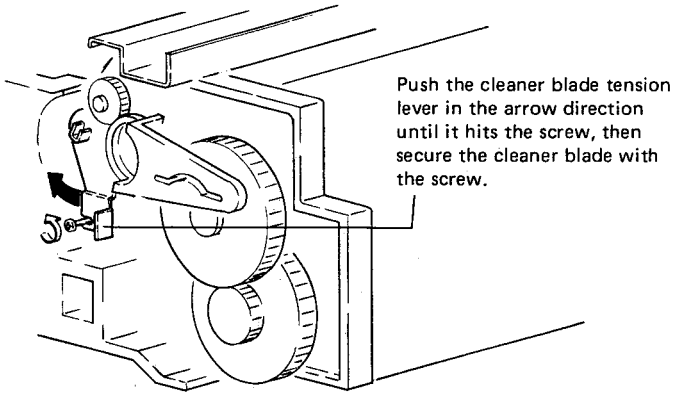


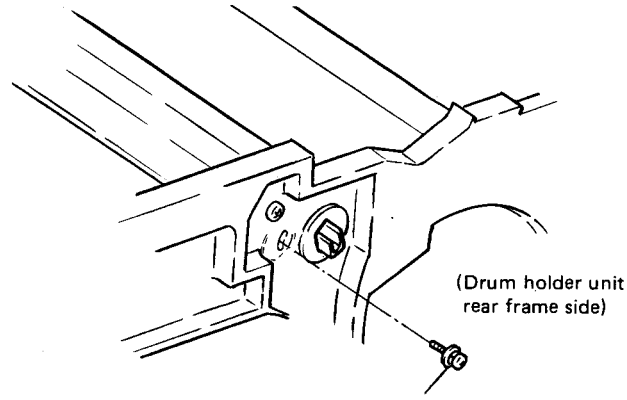




⑥ Remove the cleaner blade cover and remove the old cleaner blade.



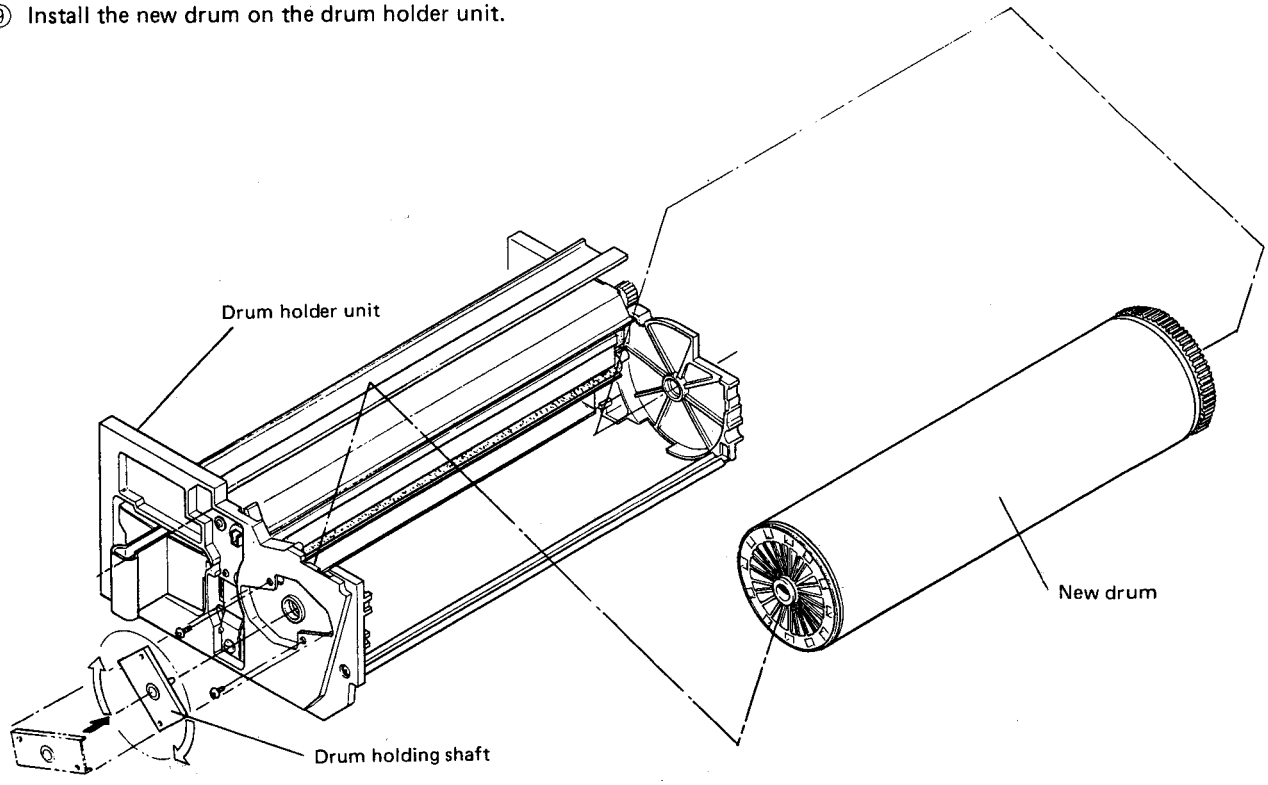
⑦ Install the new cleaner blade to the cleaner blade holding shaft.
⑧ Apply tension to the cleaner blade.


Push the cleaner blade tension lever in the arrow direction until it hits the screw, then secure the cleaner blade with the screw.
(Drum holder unit front frame side)




Tighten the cleaner blade securing screw with care not to move the cleaner blade holding shaft.

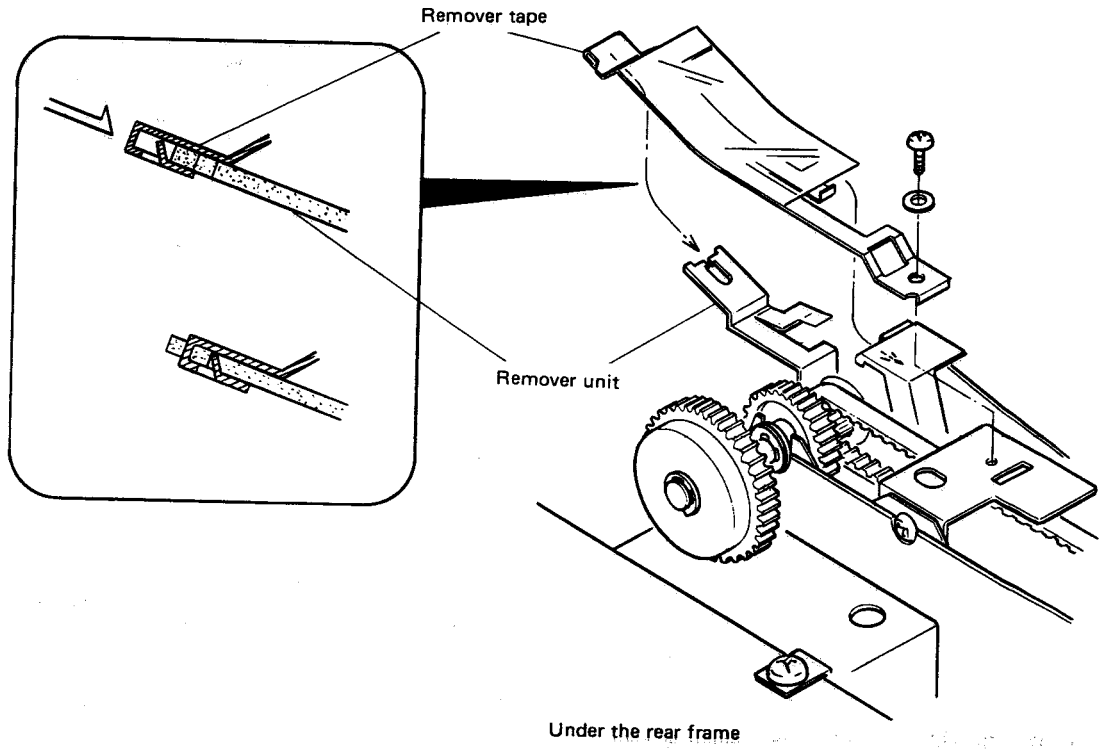
⑨ Install the new drum on the drum holder unit.



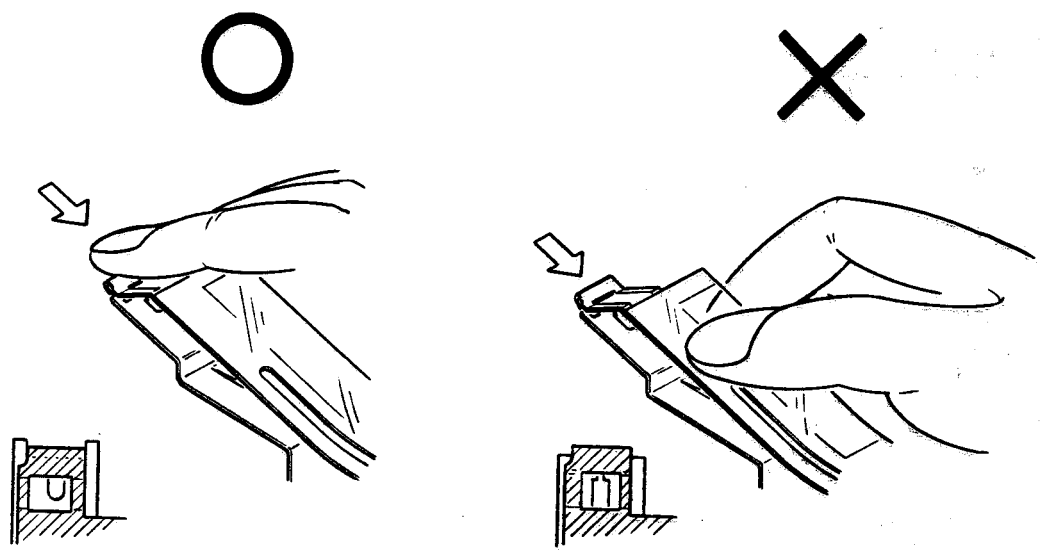
⑩ Replace the drum holder unit back in the copier.

## 2. Installing the remover tape

① Open the clam shell.
② Install the remover tape on the remover unit.

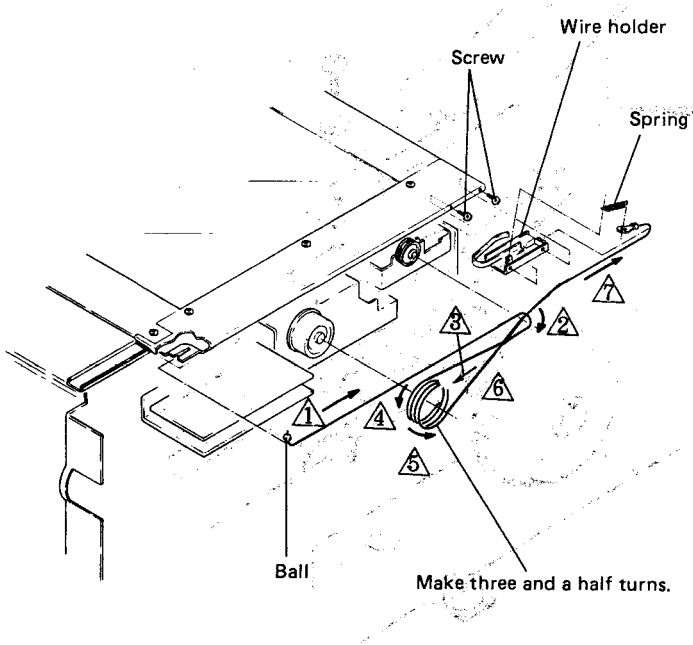



NOTE)
When installing the remover tape on the remover unit, besure to hold only the turn up end.
Then slide in, until clock sound is heard.

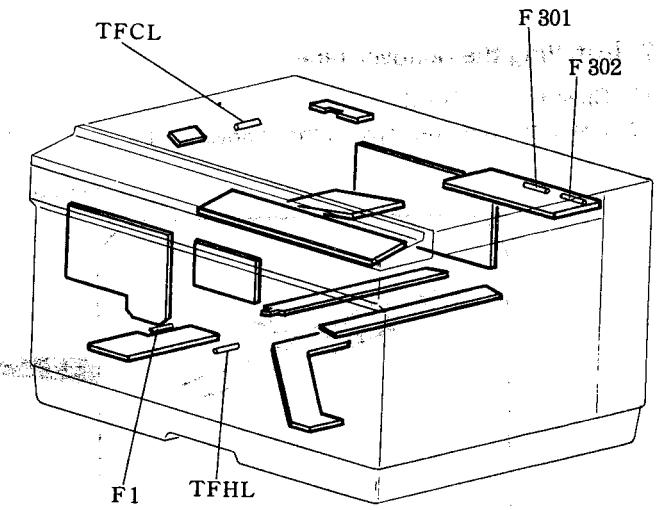


### 3. Stretching of the original table drive wire

① Secure one end of the wire fitted with the ball to the original table glass holder.
② Stretch the wire in sequence of ⚠1 thru ⚠7.
③ Engage the other end of the wire fitted with the spring hook with the spring, and attach the spring to the wire holder.
④ Install the wire holder on the original table.



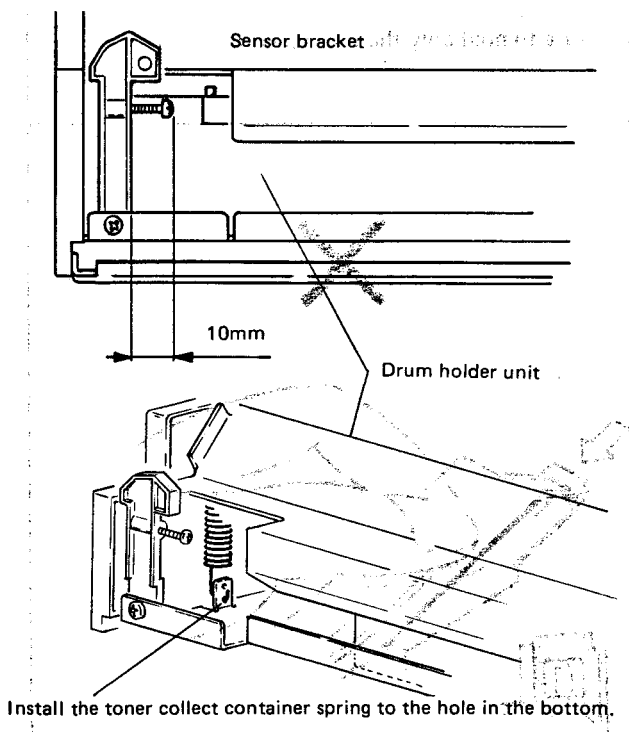

### 5. List of fuses used




| Fuse No. | Supply voltage | Capacity | Note |
|---|---|---|---|
| F1 | 100/110V | 20A | AC input |
| | 120/127V | 15A | |
| | 200/220/240V | 10A | |
| F301 | Common | 3A | Power supply PWB VC (10V) VD1 (5V) |
| F302 | Common | 5A | Power supply PWB VB (24V) VH, VH2 (30V) |
| TFCL | Common | 150°C (100V) 109°C (200V) | Copy lamp unit thermal fuse |
| TFHL | Common | 169°C | Fusing unit thermal fuse |

### 4. Toner collect container full toner sensing level adjustment

Make the sensor bracket attached screw 10mm high.



# [13] Maintenance

The SF-7200 requires preventive maintenance every 15,000 copies.

## 1. Parts Replacement

The following is a list of basic maintenance items.

| | Parts name | 15K | 30K | 45K | 60K | 75K | 90K | 105K | 120K |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Drum unit (Drum, Drum cleaner blade, Cleaning toner pack, Remover tape) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 2 | Cleaning roller unit (Cleaning roller upper, Cleaning roller lower) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 3 | Heat roller kit (Heat roller upper, Heat roller lower, Separator pawl x 3) | | | | ○ | | | | ○ |
| 4 | Remover arm | | | | ○ | | | | ○ |
| 5 | Remover roller | | | | ○ | | | | ○ |
| 6 | DV block, F and R (in the DV unit) | | | | ○ | | | | ○ |
| 7 | Corona wire | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 8 | Table brake (in the MS5, 6, and 7 holding plate) | | | | ○ | | | | ○ |
| 9 | Toner roller (in the drum holder unit) | | | | | | | | ○ |
| 10 | Toner seal blade (In the developing unit) | | | | | | | | ○ |
| 11 | Fusing frames, F and R | | | | | | | | ○ |
| 12 | Table slider | | | | | | | | ○ |
| 13 | Copy lamp reflector | | | | | | | | ○ |
| 14 | Ozone filter | | | | | | | | ○ |

## 2. Items Required for Maintenance

(1) Service documents
(2) Test chart and gray scale (UKOG-0089CCZZ)
(3) Service tool kit and digital multimeter
(4) Replacement parts
(5) Alcohol (isopropyl)
(6) Grease (UKOG-0062FCZZ) and Triflon (UKOG-0107CSZZ).
(7) Cleaning cloths (use a separate cloth for each of the following. optical system, corona wire, and general machine cleaning).
(8) DCD test sheet (UKOG-0114FCZZ)
(9) Others

## 3. Maintenance Requirements

### (1) Preliminary checks

① Make a copy in the manual exposure mode at each exposure setting. And in the auto exposure mode.
② Check the copy quality, general machine operation, and for the presence of any irregular noise.

### (2) Component removal before beginning maintenance.

① Remove the corona units.
② Remove the toner collecting container.
③ Remove the developing unit and toner hopper.
④ Remove the discharge lamp, blank lamp, and filter.
⑤ Remove the exterior panels.
⑥ Remove the drum holder unit.
⑦ Remove the drum.

The following items must be completed at the time of preventive maintenance:

### (3) Replacement of supplies, inspection, cleaning, and lubrication.

Paper feed unit
① Clean the paper feed rollers, A to D, with alcohol.
② Check the position of the paper feed roller A.
③ Lube the sintered bearings with grease.
④ Clean and lube the PF clutch.
⑤ Clean the wait roller.
⑥ MS1 and MS4 performance check.
⑦ Check the proper operation of the PS plate and PS solenoid.

Developing unit
① Adjust the developing unit after replacing the developer.
② Clean the area around the developing unit.

Separator unit
① Clean the separator roller with alcohol.
② Clean the separation arm.
③ Make sure that the separator roller rotates smoothly.
④ Clean the remover tape, and check for deformation and scratch.
⑤ Make sure that the remover tape has been set properly.

Fusing unit
① Clean the heat rollers and separator pawls with alcohol and check for scratches.
② Lube the gears and bearings.
③ Check for the proper positioning of the thermistor and the thermal fuse.
④ Replace the cleaning rollers.

Optical unit
① Clean the original cover and table glass with alcohol.
② Clean reflectors with a dry cloth, then alcohol. Finally, clean them again with a dry cloth.
③ Clean the copy lamp with alcohol.
④ Check the tension of the optics drive wire.
⑤ Clean the blank lamp filter.

High voltage units
① After replacement of the corona wire, adjust the tension.
② Clean the corona wires with alcohol and wipe dry.
③ After replacement of the main corona wire or main corona unit, perform the DCD adjustment.

Drum unit
① Clean the drum. (between P.M.)
- Wipe the drum with a clean soft cloth. Do not touch the drum with your fingers.

② Clean the drum blade, toner receive seal, and toner roller.

Others
① Lube all sintered bearings, sprockets, gears, and chains with grease.
② Clean the drive unit and photocoupler.

## 4. Overall Inspection

Perform the following operational checks upon maintenance completion:

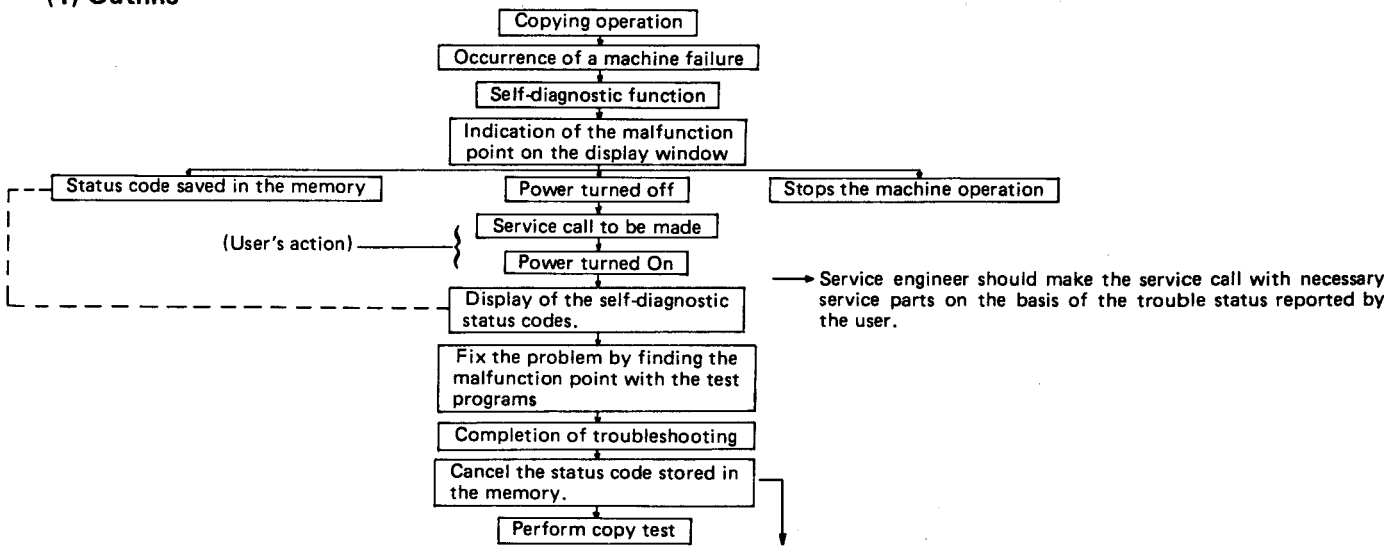
| Item | Work description | Note |
|---|---|---|
| Print related indication | ① Turn on the main power. | • Check proper warmup time (40 seconds at normal temperature).<br>• Make sure that the READY lamp lights up. Make sure that the MAINTENANCE, TONER, and MISFEED lamps are off. |
| Other indication | Check using test command. | Make sure that lamps related turn on properly. |
| Misfeed check | Push the COPY button to open the U-turn guide. | Ensure that the MISFEED indicator lights and the machine operation is suspended. |
| Misfeed reset | Open and close the front exterior, and Open and close the U-turn guide. | Ensure that the MISFEED indicator turns off. |
| CH indication | ① Turn off doorswitch.<br>② Pull out the developing unit. | Make sure that the CH indicator appears on the multicopy window. |
| Machine operation and copy quality | ① Setup the cassette.<br>② Place the Test Chart.<br>③ Make 10 copies each mode. Enlarge, normal, and reduce modes.<br>④ Make sure that the copier goes into the ready state after completion of copying.<br>⑤ Check the status in the total counter using the test command. | Copy density, Fogging, Resolution, Void area and image loss, Lead edge deviation skew, white streak, black streak, cleaning, folds, and irregular noise generation. |

# [14] Self-diagnosis and test functions

## 1. Self-Diagnostic Functions

When the copier malfunctions, operations are suspended immediately and a status code is indicated on the multi-copy display. Status codes are represented as an alpha-numeric combination of figures.

### (1) Outline


Copying operation
Occurrence of a machine failure
Self-diagnostic function
Indication of the malfunction point on the display window
Status code saved in the memory
Power turned off
Stops the machine operation
(User's action)
Service call to be made
Power turned On
Display of the self-diagnostic status codes.
Service engineer should make the service call with necessary service parts on the basis of the trouble status reported by the user.
Fix the problem by finding the malfunction point with the test programs
Completion of troubleshooting
Cancel the status code stored in the memory.
Perform copy test

① When one of the test status of L1, L2, L3, L4, L5, H1, H2, H4, P1, and C2 is indicated, it may be cleared by turning the power off.

② When the test status U1 is indicated, it may be cleared by test command 13.

③ When the status code CH is indicated, it may be cleared automatically upon completion of troubleshooting, without entering a test command.

④ When status code H3 is indicated, it may be cleared by test command 14.

## (2) Types of self-diagnosis

| Status code | Trouble symptom | Test command used |
|---|---|---|
| L1 | Failure in the table feed operation (MS7 malfunction) | 02, 01 → 14 |
| L2 | Failure in the table feed operation (MS6 malfunction or table drive unit malfunction). | 02, 01 → 14 |
| L3 | Failure in the table return operation (MS5 or table drive unit malfunction) | 02, 01 → 14 |
| L5 | Trouble in lens action. The lens does not come to the given position of the normal or enlargement within 12 seconds after assignment of the normal or enlarge mode. | 26, 27 → 14 |
| H1 | Open heat roller thermal fuse | → 14 |
| H2 | Open heat roller thermistor | → 14 |
| H3 | Heat roller irregularly high temperature above 220°C | 06 → 14 |
| H4 | Heater low temperature trouble.<br>1. When the machines fails to reach the ready level (180°C) within 90 seconds after power on.<br>2. When the copy lamp is kept active for more than 15 seconds once after going into the ready state.<br>3. When the heater temperature went below 160°C for more than 4 minutes once after going into the ready state (180°C). | 06 → 14 |
| P1 | Open copy lamp thermal fuse. | – |
| C2 | Shorted or open THVG unit or corona wire. | 10 |
| U1 | Voltage drop in the memory backup battery (below 2.27V). | 41, 18, 19 → 13 |
| U2 | Data transfer trouble between the main circuit and memory circuit. | – |
| CH (ON) | Open front cover or lower right over, or a failure in the doorswitch (DSW1, (DSW2, DSW3). | – |
| CH (Flicker) | Developing unit not inserted in the machine or connector contact failure. | |
| PC | Counter (SF71A) is not insert in personal counter mode. | – |

## 2. Test Command Functions

Test functions are used to clarify and pinpoint malfunctions in accordance with the status codes and to manipulate operations in the machine by entering an appropriate test command. The status code can be checked, changed, or cancelled by the test command function. In addition, various check-out functions may be performed.

### (1) Actuation of the test command functions.

① Depress CLEAR, REPEAT, ZERO, and PAUSE keys in that order. All of the indicators on the operation panel will go out, and the machine will be ready to accept test commands.
If you do not complete the entering of CLEAR, REPEAT, ZERO, and PAUSE keys within 5 seconds, the copier will not go into the test mode. You will have to perform the command entry all over again.

② Program the test command by entering the two-digit command code. Although any number of digits can be entered through the keyboard, only the last two digits are effective.

③ Depression of the PSW after the two digit entry, enables the test program as defined by the key entry.

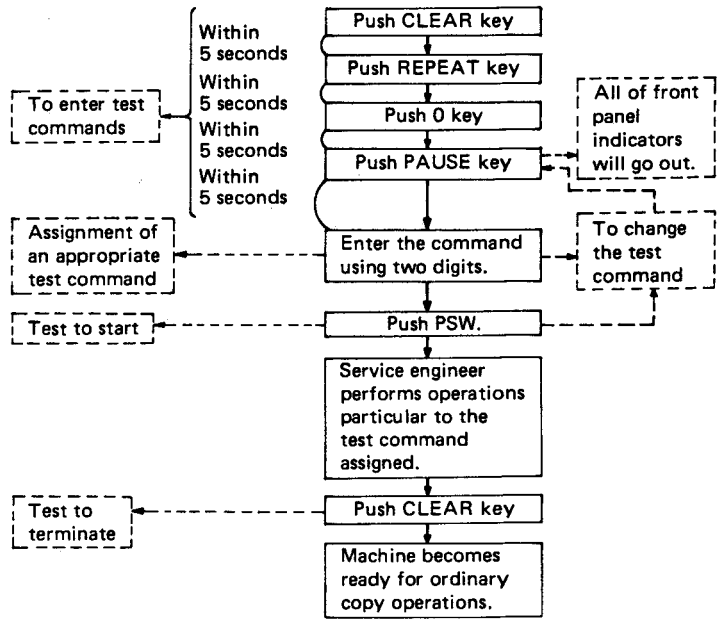
④ To change the command, press the PAUSE key. The test program under execution is terminated and all of front panel indicators will go out. The control returns to Step (2) and is ready for a new entry.

⑤ To terminate the test operation, press the CLEAR key. The control will return to the copier mode.
(NOTE)

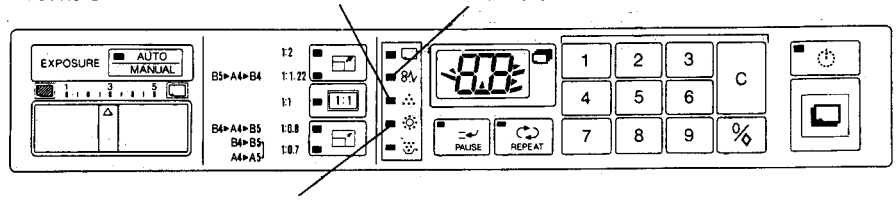
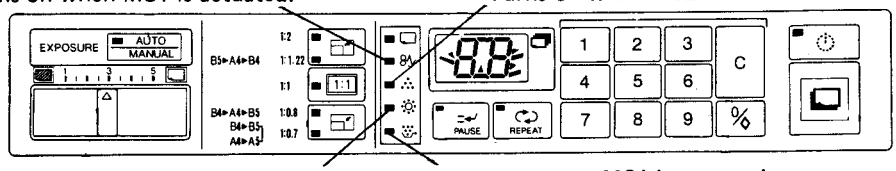
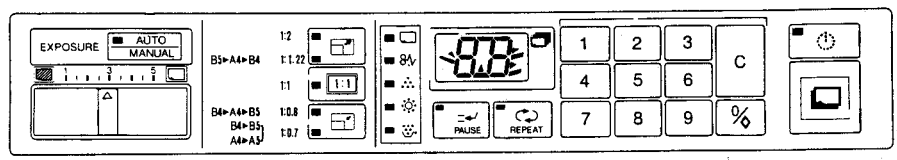
- Depression of the PAUSE key will discontinue the test operation for the test commands listed below:
  01, 02, 03, 04, 05, 06, 07, 09, 10, 11, 12, 15, 16, 18, 19, 20, 25, 26, 27, 40, 41, 42, 66, 67.
- Any operation listed below will discontinue test programs, 21, 22, 23, or 24:

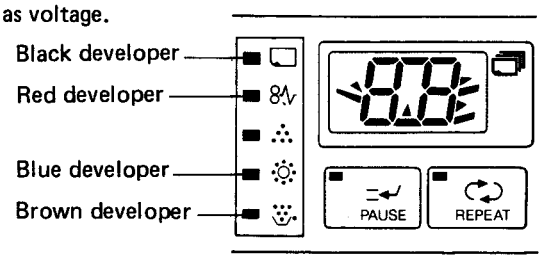
  1. Power switch off.
  2. Push CLEAR → REPEAT → 0 → PAUSE → CLEAR keys.
  3. Push CLEAR → REPEAT → 0 → PAUSE → 1 → 4 → PAUSE keys.

- Test commands 13 and 14:
  Test command, 13 and 14, are used to clear the contents of the test command memory stored in the LSI, the program will clear automatically upon the completion of the test programs, 13 or 14.
  After this, the machine will go to the ordinary operational mode.


Push CLEAR key
Within 5 seconds
Push REPEAT key
Within 5 seconds
Push 0 key
Within 5 seconds
Push PAUSE key
Within 5 seconds
To enter test commands
All of front panel indicators will go out.
Assignment of an appropriate test command
Enter the command using two digits.
To change the test command
Test to start
Push PSW.
Service engineer performs operations particular to the test command assigned.
Test to terminate
Push CLEAR key
Machine becomes ready for ordinary copy operations.

## (2) Types of test commands and their functions.

| Test command No. | Function |
|---|---|
| 01 | The table is automatically moved forward and backward to permit testing of table movement. When the table actuates microswitches, MS5, MS6, and MS7, it makes the relevant LED actuated. Operation under any magnification mode is possible by the use the magnification key.<br>Turns on when MS6 is actuated. Turns on when MS5 is actuated.<br>  <br>Turns on when MS7 is actuated. |
| 02 | Table may be moved by hand to check on/off action of MS5, MS6, and MS7. The LED's are turned on in the same manner as in test command 01. |
| 03 | Manually actuate MS1, MS2, MS3, and MS4, to check operation of those microswitches.<br>Turns on when MS1 is actuated. Turns on when MS2 is actuated.<br>  <br>Turns on when MS3 is actuated. Turns on when MS4 is actuated. |
| 05 | All indicators on the operation panel are turned on for a period of 5 seconds to check for a lamp failure or a related circuit.<br>  |
| 06 | Heater lamp is turned on and off five times. If the heater lamp turns on (0.7 seconds) and off (0.7 seconds) five times, there is no failure in the output section of the LSI or associated circuits. If the heater lamp continues to be on or off, it can be assumed that the failure is in the triac or heater lamp, or the LSI output section.<br>NOTE: If the fuser rollers are at proper temperature (WTL), the heater lamp will not turn on in this test command. This will prevent an over temperature condition in the fuser unit. |
| 07 | Copy lamp is activated for 5 seconds. This allows checking of the voltage on the CL Reg PWB while the copy lamp is active. Auto exposure and manual exposure are possible. |
| 09 | MHVG is turned on for 30 seconds. This test command allows performance of the current adjustment for the MHVG, main PWB signal checks, or proper functioning of the MHVG. |
| 10 | THVG is turned on for 30 seconds. This test command allows checking of the main PWB voltage or proper functioning of the THVG. |
| 11 | DHVG is turned on for 30 seconds. This test command allows checking of the main PWB voltage or proper functioning of the DHVG. |
| 12 | The discharge lamp, void lamp, and blank lamp are activated for 30 seconds. When the reduction mode is assigned for the depression of the PRINT switch, blank lamps pertinent to that reduction mode are turned on. This test command allows checking of the output voltage (or activation of the discharge lamp) and main PWB voltage while the discharge lamp is active. |

| Test command No. | Function |
|---|---|
| 13 | Used to cancel the status code U1. |
| 14 | Used to cancel the status code other than U1, U2 and CH. |
| 16 | Used to check the maintenance preset counter contents. Set to 15000 with the SF-7200, and its contents will be displayed on the multicopy window in three cycles to indicate a whole number, two digits at a time.<br>01 → Blank → 20 → Blank → 00 → Long blank |
| 18 | Used to check the machine's total copy count. Will be displayed in the same manner as (16) above. |
| 19 | Actual copy count in the maintenance counter is displayed. Will be displayed in the same manner as (16) above. |
| 20 | Used to reset the maintenance counter to zero after the completion of machine maintenance. This test command must be executed after completion of machine maintenance. |
| 21 | 1. Used to check the warmup time.<br>2. Used to perform the aging test according to the entered copy number. When the test command is executed, the machine goes into the ordinary machine operating mode, and the warmup time starts to count from 0 and increases every 2 seconds. The warmup time is indicated on the multi-copy window. When the RPL turns on, warmup counting is stopped and the display remains as it is. Depression of the CLEAR key, entry of a copy number, and depression of the REPEAT key followed by the PSW begins the aging operation until the entered copy number is reached. The paper misfeed detect functions stays active. |
| 22 | The aging test is carried out without using paper. The paper misfeed sensor is disabled. |
| 23 | Though identical to the test command 21, the warmup time is omitted and the heater throuble detect function and paper misfeed detect function is disabled. The heater lamp does not actuate.) |
| 24 | Permits machine operational checks by omitting warmup time. RPL lights up immediately after the execution of the test command. Though it is possible to immediately proceed to check machine operations, status code H4 may appear when operating at a low temperature. |
| 25 | 1. Used to adjust the developer level (toner level).<br>2. Used to check action of rotating parts. With this test command, the main motor runs for 1 minute while applying the developing bias. The TPL will turn on if the toner level is too low.<br>3. Used to check the developing bias voltage.<br>  |
| 26 | The lens moves from normal → x 0.8 → x 0.7 → x 2.0 → x 1.22 → normal (AB series). Lens moves from normal → x 0.75 → x .064 → x 2.0 → x 1.22 → normal (inch series). The lens stops for 2 seconds at each position. Used to check dark box operations. |

| Test command No. | Function |
|---|---|
| 27 | (AB series) normal → x 0.8 → x 0.7 → x 2.0 → x 1.22 Lens steps through the ratios continuously (aging).<br>(Inch series) Lens is moved from normal → x 0.75 → x 0.64 → x 2.0 → x 1.22 Lens steps through the ratios continuously.<br>Lens stop 2 seconds at each point. Used to check dark box operations. |
| 40 | Displays the contents of the developer preset counter, in a similar manner as test command 16. Also, the kind of developer in use can be monitored on the display, in a similar manner as test command 25. |
| 41 | Displays the contents of the copy number preset counter, in a similar manner as test command 16. Also, the kind of developer in use can be monitored on the display, in a similar manner as test command 25. |
| 42 | Resets the contents of the copy number counter, in a similar manner at test command 16.<br>Also, the kind of developer in use can be monitored on the display, in a similar manner as test command 25. |
| 50 | Used to enter the copy lead edge adjusting value.<br>Method:<br>Key entry: [C] → [R] → 0/◇ → [P] → [5] → 0/◇ → PSW → Number to set (PSC) → PSW (one copy is produced).<br>NOTE: Operation must be done in the ready state. |
| 66 | Used to set the auto power down function active or to check assignment of the auto power down function. Make the following sequence of key entry: [C] → [R] → 0 → [P] → [6] → [6]<br>If the PDPL is on, it indicates the assignment of the auto power down function. If not on, the auto power down function is not assigned. To set the auto power down function active, push the power down key after the above key operation. Make sure that the PDPL is on. Then, push the PRINT switch.<br>To clear the auto power down function, push the power down key. Make sure that the PDPL is out. Then, push the print switch. |
| 67 | Make a copy is each mode of magnification in the following sequence. x 2.0 → x 0.7 → x 1.22 → x 0.8 → x 1.0<br>After completion of coping, the copier stays in the ready state in the x 2.0 mode. With the repeat function, copy may be repeated produce in any magnification ratio.<br>(Example):<br>Push 2 → R → PSW in the ready state. This will produce two copies each in the magnification ratio. |

NOTE-1: The doorswitch must be closed when test command, 1, 6, 7, 9, 10, 11, 12, 22, 23, 24, 25, 26, 27, 50, 66, 67 is executed.
If the doorswitch is open, the test command will not be executed.
If the warmup time is to be checked with the test command 21, the doorswitch must be closed after the entry of the test command.
The test command, 40, 41, and 42, corresponds to inserted developing color. If developing unit is not inserted in the machine, then check lamp flickers and the test command will not be executed.

# [15] Electrical section

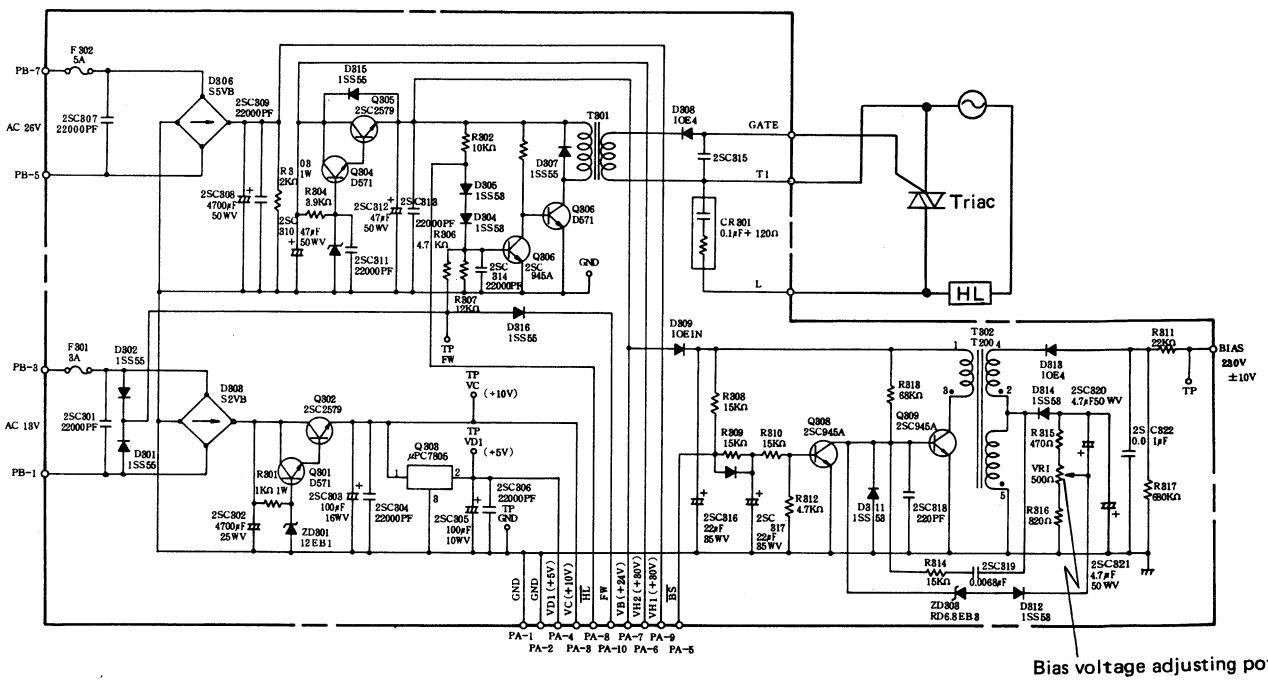
## 1. DC Power Supply Circuit

In addition to the DC power supply circuit, the bias circuit and the heater lamp control circuit are contained in the DC power supply PWB.

### (1) Signal name vs output voltage

GND : 0V
VD1 : +5V (LSI and IC supply power)
VC : +10V (IC supply power)
$\overline{HL}$ : Heater lamp control signal. The low state (0V) of the signal makes the heater lamp activated.
FW : All wave rectified waveform

VB : +24V (Solenoid and lamp supply power)
VH1, VH2 : About 30V (High voltage transformer supply power)
$\overline{BS}$ : Bias control signal. Low state (0V) of the signal outputs the bias voltage (230 ± 10V).
BIAS : Bias output (230 ± 10V).



## 2. Main Circuit (see the circuit diagram)

### (1) Main circuit-1

① IC101 signal description

| Pin No. | In/Out | Signal name | Description |
|---|---|---|---|
| 1 | Out | AB15 | Address bus. |
| 2 | | NC | Not used. |
| 3~10 | In/Out | DB0~DB7 | Data signal. |
| 11 | In | PT | PT input. |
| 12 | | GND | 0V. |
| 13 | In | POF | Supply voltage select detect signal. |
| 14 | | $\overline{\text{Wait}}$ | Connected to VD1. |
| 15 | | NC | Not used. |
| 16 | Out | $\overline{\text{WR}}$ | Low state (0V) of the signal writes data in I/O and RAM. |
| 17 | Out | $\overline{\text{RD}}$ | Low state (0V) of the signal read I/O and RAM contents. |
| 18 | In | PT | PT input. |
| 19 | Out | MC | ROM select signal. |
| 20 | Out | IO/M | I/O port and memory port select signal. The I/O port is selected with a high state of the signal. The memory port is selected with a low state of the signal. |
| 21 | Out | DCH | |
| 22 | Out | HL | Heater lamp actuating signal. A high state of this signal (+5V) actuates the heater lamp. |
| 23 | In | $\overline{\text{KI1}}$ | Key input. |
| 24 | Out | CLR | Copy lamp actuating signal. A high state of this signal (+5V) actuates the copy lamp. |
| 25 | Out | PR | Power relay actuating signal. A high state of this signal (+5V) actuates the power relay. |
| 26 | | SCK | Connected to VD1. |
| 27 | | GND | 0V. |
| 28 | | NC | Not used. |
| 29 | In | $\overline{\text{RESET}}$ | Reset signal. A low state of this signal (0V) resets the CPU. |
| 30 | | X2 | Clock pulse. |
| 31 | | X1 | Clock pulse. |
| 32 | | GND | 0V. |
| 33 | Out | Z0 | Switch sensing strobe. |
| 34 | Out | Z1 | Switch sensing strobe. |
| 35 | Out | Z2 | Switch sensing strobe. |
| 36 | Out | AE | Auto exposure mode select signal. A high state of this signal (+5V) sets the copier in the auto exposure mode. |
| 37 | Out | MMR | Main motor relay actuating signal. A high state of this signal (+5V) actuates the main motor. |
| 38 | Out | TRC | Table return clutch actuating signal. A high on this line actuates the table return. |
| 39 | Out | TFC | Table feed clutch actuating signal. A high on this line actuates the table feed. |
| 40 | Out | PSS | Paper stop. |
| 41 | Out | $\overline{\text{SL}}$ | Blank lamp actuating signal. A low on this line actuates the blank lamp. |
| 42 | Out | UPFS | Paper feed solenoid actuating signal. A high state of this signal (+5V) actuates the paper feed solenoid. |
| 43 | In | I0 | Switch sensing strobe. |
| 44 | In | I1 | Switch sensing strobe. |
| 45 | In | I2 | Switch sensing strobe. |
| 46 | In | I3 | Switch sensing strobe. |
| 47 | In | I4 | Switch sensing strobe. |
| 48 | In | I5 | Switch sensing strobe. |
| 49~61 | Out | AB0~AB12 | Address bus signal. |
| 62, 63 | | NC | Not used. |
| 64 | | VD1 | +5V supply. |

② IC 102 signal description

| Pin No. | In/Out | Signal name | Description |
|---|---|---|---|
| 1 | Out | STM1 | Lens drive motor (STM) control signal. |
| 2 | Out | STM2 | Lens drive motor (STM) control signal. |
| 3 | Out | STM3 | Lens drive motor (STM) control signal. |
| 4 | Out | STM4 | Lens drive motor (STM) control signal. |
| 5 | In | RD | Connected to VD1. |
| 6 | In | AB2 | Address signal. |
| 7 | | GND | 0V. |
| 8 | In | AB1 | Address signal. |
| 9 | In | AB0 | Address signal. |
| 10 | Out | MDL4 | Display drive common signal. A high state of this signal (+5V) drives the display common line. |
| 11 | Out | MDL3 | Display drive common signal. A high state of this signal (+5V) drives the display common line. |
| 12 | Out | MDL2 | Display drive common signal. A high state of this signal (+5V) drives the display common line. |
| 13 | Out | MDL1 | Display drive common signal. A high state of this signal (+5V) drives the display common line. |
| 14 | Out | I | Display drive signal. A high state of this signal (+5V) drives the display. |
| 15 | Out | J | Display drive signal. A high state of this signal (+5V) drives the display. |
| 16 | Out | EL | Enlarge (x2.0) copy mode signal. |
| 17 | Out | RPL | Ready pilot lamp actuating signal. A high state of this signal (+5V) actuates the lamp. |
| 18 | Out | MHVG | MHVG control signal. A high state of this signal (+5V) actuates the MHVG. |
| 19 | Out | THVG | THVG control signal. A high state of this signal (+5V) actuates the THVG. |
| 20 | Out | DHVG | DHVG control signal. A high state of this signal (+5V) actuates the DHVG. |
| 21 | Out | Y1 | Enlarge (x1.2) mode clutch signal. A high state of this signal (+5V) actuates the clutch. |
| 22 | Out | Y2 | Normal (x1.0) mode clutch signal. A high state of this signal (+5V) actuates the clutch. |
| 23 | | NC | Not used. |
| 24 | Out | Y3 | Reduce (x0.8) (x0.75) mode clutch signal. A high state of this signal actuates the clutch. |
| 25 | Out | Y4 | Reduce (x0.7) (x0.64) mode clutch signal. A high state of this signal actuates the clutch. |
| 26 | | VD1 | +5V supply. |
| 27~34 | In | DB0~DB7 | Data bus signal. |
| 35 | In | RESET | Reset signal. A low on this line (0V) resets the copier. |

| Pin No. | In/Out | Signal name | Description |
|---|---|---|---|
| 36 | In | $\overline{WR}$ | Write signal. A high state of this signal writes data. |
| 37 | Out | BCEK-OUT | Battery voltage check signal. Goes high for a certain period immediately before actuation of the ready lamp. |
| 38 | Out | PC | Personal counter advance signal. |
| 39 | Out | TMR | Toner motor relay actuating signal. A high state of this signal actuates the toner motor. |
| 40 | Out | DLR | Discharge lamp signal. A high state of this signal actuates the discharge lamp. |

③ IC105 signal description

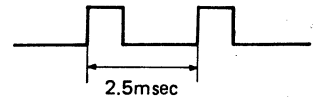
| Pin No. | In/Out | Signal name | Description |
|---|---|---|---|
| 1 | | $\overline{POF}$ | Connected to GND (0V). |
| 2 | Out | A | Display drive signal. A high state of this signal drives the display. |
| 3 | In | DB0 | Data signal. |
| 4 | In | DB1 | Data signal. |
| 5 | Out | B | Display drive signal. A high state of this signal drives the display. |
| 6 | Out | C | Display drive signal. A high state of this signal drives the display. |
| 7 | In | DB2 | Data signal. |
| 8 | In | DB3 | Data signal. |
| 9 | Out | D | Display drive signal. A high state of this signal drives the display. |
| 10 | | GND | 0V. |
| 11 | In | WRAB3 | Write signal. A high state of this signal (+5V) writes data. |
| 12 | Out | E | Display drive signal. A high state of this signal drives the display. |
| 13 | In | DB4 | Data signal. |
| 14 | In | DB5 | Data signal. |
| 15 | Out | F | Display drive signal. A high state of this signal drives the display. |
| 16 | Out | G | Display drive signal. A high state of this signal drives the display. |
| 17 | In | DB6 | Data signal. |
| 18 | In | DB7 | Data signal. |
| 19 | Out | H | Display drive signal. A high state of this signal drives the display. |
| 20 | | VD1 | +5V supply. |

④ BCIN : When the battery voltage drops below 2.27V, it does not go high level (+5V) in the battery check timing.

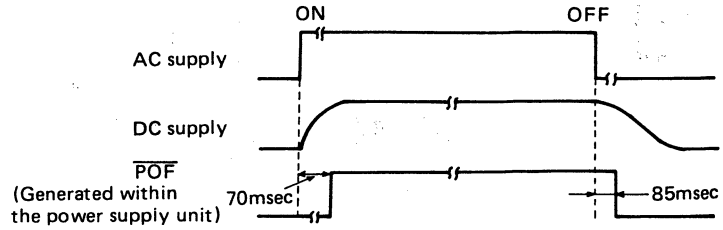
**(2) Main circuit-2**

(1) Detect circuit signals

- PT : PT sensor output signal.

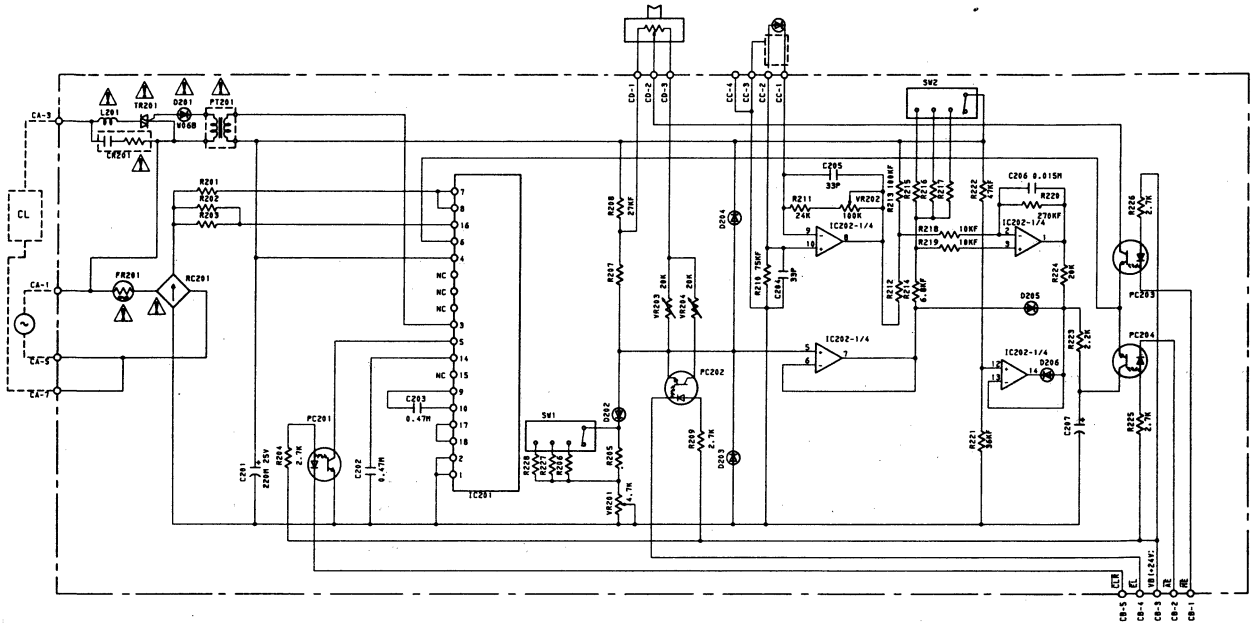



- $\overline{POF}$ : The signal used to inform the LSI whether the supply voltage is within the regulated level, which takes the following action.



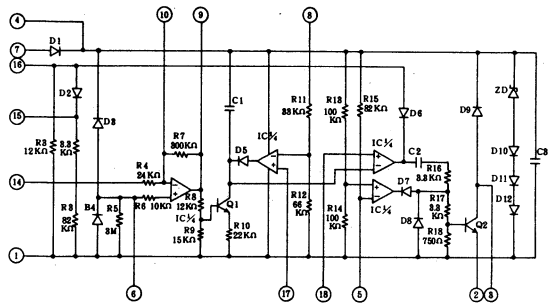

- HTO : The signal used to detect the open state of the heat roller thermistor. If the thermistor is open, its output goes high (10V).
- HTL : The heat roller lower limit temperature detect signal which goes high (10V) when the heat roller temperature drops below 160°C.
- HTH : The heat roller upper limit temperature detect signal which goes high (10V) when the heat roller temperature goes above 220°C.
- WTLL : The signal used to interrogate if the heat roller temperature is at the given rating of 120°C during power down.
  A low on this line (0V) actuates the heater lamp, and a high on this line (10V) deactuates the heater lamp.
- WTL : The signal used to interrogate if the heat roller temperature is at the given rating of 180°C.
  A low on this line (0V) actuates the heater lamp, and a high on this line (10V) deactuates the heater lamp.
- TSG : Toner empty signal.
  It goes low level (0V) when the toner concentration decreases.
- TSW1 : DV color sensing signal.
  The respective color is in use when the signal is in low level (0V). (Black)
- TSW2 : DV color sensing signal.
  The respective color is in use when the signal is in low level (0V). (Red)
- TSW3 : DV color sensing signal.
  The respective color is in use when the signal is in low level (0V). (Blue)
- TSW4 : DV color sensing signal.
  The respective color is in use when the signal is in low level (0V). (Brown)
- LNSW : Lens position sensing signal.
  Goes low (0V) when the lens locates at the given magnification position.

## 3. CLR Circuit



Basically, the CLR circuit is similar to the conventional one.
The IC201 is a hybrid IC operating the common section of the CLR basic circuit.

IC201 Internal circuit diagram



1. 2 pin : GND
   3 pin : Triac control output.
   4 pin : Internal power supply output (19.6V).
   5 pin : Output control signal. The triac control is issued from the 3-pin when the signal is in low level (0V).
   6 pin : Exposure control input.
   Input voltage in crease: Copy lamp more intense.
   Input voltage decrease: Copy lamp less intense.
   7 pin : Power supply input. (All wave rectified waveform)
   8 pin : Power supply input. (All wave rectified waveform).
   9 pin : Reference voltage. Exposure control input voltage compared and amplified output.
   10 pin : Reference voltage (changes proportionate to the AC supply voltage).
   14 pin : Reference voltage.
   15 pin : Reference voltage.
   16 pin : All wave rectified waveform input.
   17 pin : Reference voltage input (9.8V).
   18 pin : Reference voltage output (9.8V).

- SW1 : Drum sensitivity select switch.
- SW2 : Auto exposure correction switch.
- $\overline{\text{CLR}}$ : Copy lamp actuating signal. A low on this line (0V) makes the PC201 active so as to actuate the copy lamp.
- $\overline{\text{EC}}$ : Goes low level (0V) during the enlarge copy (x2.0) mode. A low on this line makes the PC 202 active so as to operate in the x2.0 exposure.
- $\overline{\text{AE}}$ : Auto exposure mode signal. Goes low (0V) in the auto exposure mode. A low on this line makes the PC202 active so that the IC202 #1-pin output (AE control output) is supplied to the #6-pin of the IC201 to perform the automatic exposure.
- $\overline{\text{ME}}$ : Manual exposure mode signal. Goes low (0V) in the manual exposure mode. A low on this line makes the PC203 active, and the exposure control VR mid-point voltage is supplied to the #6-pin of the IC201 to perform the manual exposure.

## 4. Operation Circuit (see the circuit diagram)

### (1) Kinds of keys

PSW : Print switch
0~9 keys : Copy count set keys
RP : Repeat key
Z down : Reduce mode key
NK : Normal mode key
PDSW : Preheat mode key
CK : Clear key
P key : Pause key
AE : Auto/manual exposure mode select switch
Z up : Enlarge mode key

### (2) Display unit signals

ZL1 (LD501) : Reduce mode (x0.7, x0.64) indication
ZL2 (LD502) : Reduce mode (x0.8, x0.7) indication
ZL3 (LD503) : Normal mode (x1.0) indication
ZL4 (LD504) : Enlarge mode (x1.2) indication
ZL5 (LD505) : Enlarge mode (x2.0) indication
TFL (LD506) : Full waste toner indication
DVL (LD507) : DV indication
TPL (LD508) : Toner empty indication
JPL (LD509) : Misfeed indication
PEML (LD510) : Paper empty indication
PDPL (LD511) : Preheat mode indication
REL (LD512) : Repeat indication
SL (LD513) : Pause indication
AE (LD514) : Auto exposure indication